

Groundwater Resources and Groundwater Pollution Potential

The entire watershed is serviced by public water systems. Lake Erie is the source of all public drinking water in Lake County, and only small isolated areas may still rely on groundwater for domestic use. The aquifers in the watershed produce very limited quantities of water and are often susceptible to pollution due to the wells being completed at very shallow depths. Aller and Ballou (Groundwater Pollution Potential of Lake County, 1991) describe the aquifer north of the escarpment (which would include all of the Mentor Marsh Watershed):

“North of the escarpment the most pervasive aquifer is the thick layer of glacial till between lacustrine deposits and the bedrock. This unit typically yields only meager ground water supplies to large diameter dug wells or wells drilled to the interface between the till and the bedrock. Other less widespread aquifers in this region include the beach ridge sand deposits, and alluvial sand and gravel units underlying portions of the floodplains of major streams.”

There are 5 main “Hydrologic Settings” identified in the watershed by the Groundwater Pollution Potential of Lake County report. Each setting is divided into smaller units with appropriate values assigned that represent vulnerability to pollution.

(7Ae) Glacial Till Over Shale

This hydrogeologic setting consists of varying thicknesses of glacial till overlying fractured, flat-lying shales. The till is principally unsorted deposits with interbedded lenses of loess and sand and gravel. Ground water is derived from either localized sources in the overlying till or from deeper, more permeable formations. The shale is relatively impermeable and does not serve as a source of ground water. Although precipitation is abundant, recharge is minimal from the till to deeper formations and occurs only by leakage of water through the fractures.

Map unit 7Ae9 was the only identified unit in this Hydrogeologic Setting.

(7Eb) River Alluvium Without Overbank Deposits

This hydrogeologic setting is characterized by low topography and deposits of alluvium along parts of stream valleys. Water is obtained from sand and gravel layers deposited within the valley. Significant fine-grained floodplain deposits are present in the stream valley. This results in significantly higher recharge where precipitation is adequate and sandy soils occur at the surface. Water levels are moderate to shallow in depth. Hydraulic contact with the surface stream is usually excellent, with alternating recharge/discharge relationships varying with stream stage. These deposits also serve as a good source of recharge to the underlying fractured bedrock.

Map unit 7Eb1 was the only identified unit in this Hydrogeologic Setting.

(7F) Glacial Lake Deposits

This hydrogeologic setting is characterized by flat topography and varying thicknesses of fine-grained sediments that overlie sequences of fractured sedimentary rocks. The deposits are composed of fine-grained silts and clays interlayered with fine sand that settled out in glacial lakes and exhibit alternating

layers relating to seasonal fluctuations. As a consequence of the thin, alternating layers there is a substantial difference between the vertical and horizontal permeability with the horizontal commonly two or more orders of magnitude greater than the vertical. Due to their fine-grained nature, these deposits typically weather to organic-rich sandy loams with a range in permeabilities reflecting variations in sand content. Underlying glacial deposits or bedrock serve as the major source of ground water in the region. Although precipitation is abundant, recharge is controlled by the permeability of the surface clays; however, in all instances recharge is moderately high because of the impact of the low topography. Water levels are variable, depending on the thickness of the lake sediments and the underlying materials.

Map units 7F1, 7F2, 7F3, and 7F5 were identified in this Hydrogeologic Setting.

(7H) Beaches, Beach Ridges and Sand Dunes

This hydrogeologic setting is characterized by low relief, sandy surface soil that is predominantly silica sand, extremely high infiltration rates and low sorptive capacity in the thin vadose zone. The water table is very shallow beneath the beaches bordering the Great Lakes. These beaches are commonly ground-water discharge areas. The water table is slightly deeper beneath the rolling dune topography and the vestigial inland beach ridges. All of these areas serve as recharge sources for the underlying sedimentary bedrock aquifers, and they often serve as local sources of water supply.

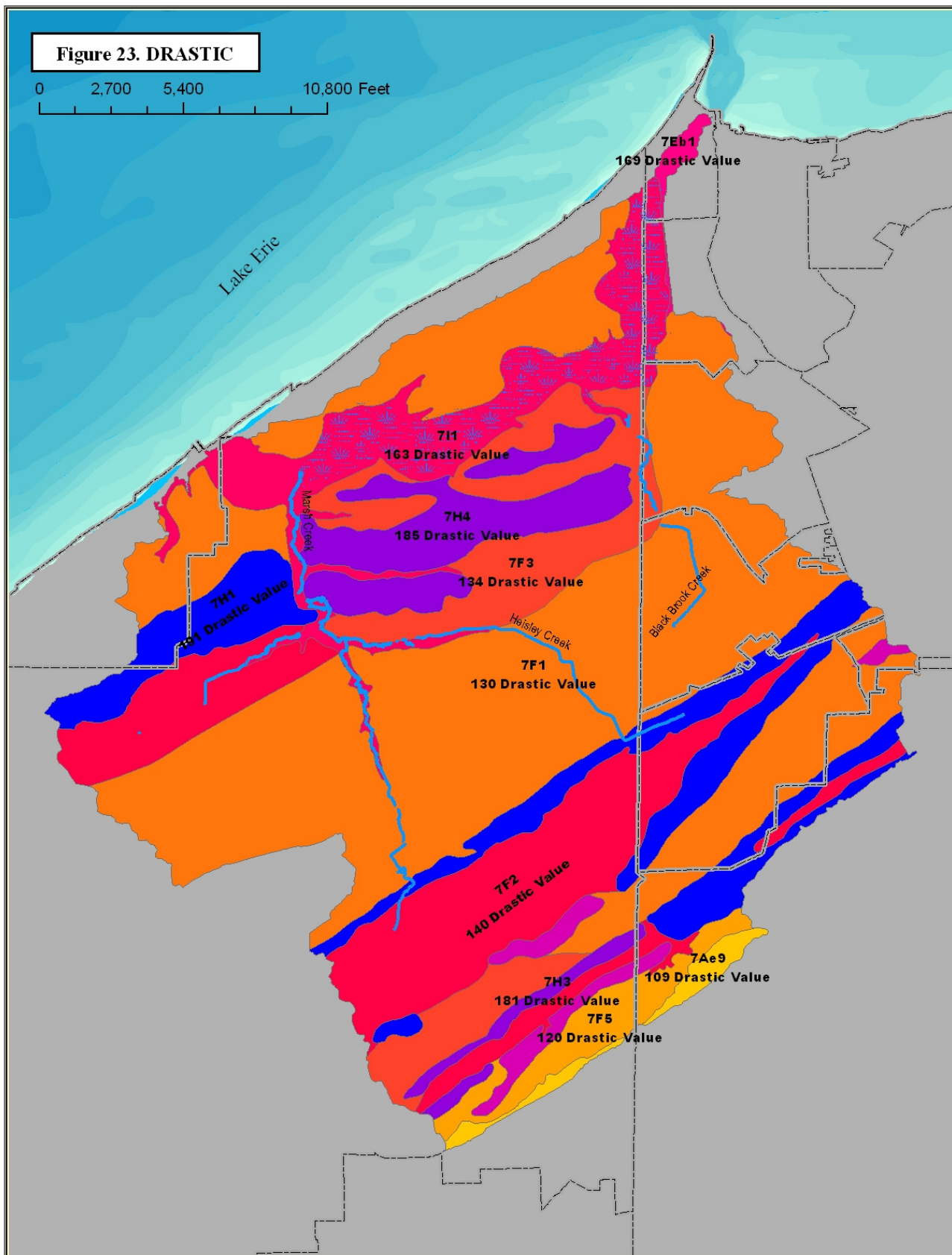
Map units 7H1, 7H3, and 7F4 were identified in this Hydrogeologic Setting.

(7I) Swamp/Marsh

This hydrogeologic setting is characterized by low topographic relief, high water levels and high organic silt and clay deposits. These wetlands occur along the courses of floodplains and in upland areas as a result of vertically restricted drainage. Common features of upland wetlands include those characteristics attributable to glacial activity such as filled-in glacial lakes, potholes and cranberry bogs. Recharge is moderate in most of the region due to restriction by clayey soils and limited by precipitation. The swamp deposits very rarely serve as significant aquifers but frequently recharge the underlying sand and gravel or bedrock aquifers.

Map unit 7I1 was the only identified unit in this Hydrogeologic Setting.

Figure 23 shows the DRASTIC ratings for the Mentor Marsh Watershed.



Land Use

Existing Land Use and Predicted Trends

Existing land use in the watershed is similar to most urbanized land along the lake front. An analysis of the Ohio GAP project land cover indicates approximately 50% of the watershed has been developed into either “High Density Development” or “Low Density Development”. In addition to the developed land use, the associated “Urban / Park Lawn” and “Urban Forest” account for almost 30% of the land use in the watershed. Photo-interpretation with high-resolution (6” pixel) aerial images and ground-truthing indicates some error in the “Row Crop” class. A more appropriate classification of this land cover would be “Urban / Park Lawn”, essentially large areas of turf grass. A reclassification of “Row Crop” to “Urban / Park Lawn” would then yield a total of 43% of the watershed in an undeveloped but modified land use. The following table summarizes the land cover/land use in the watershed from the Ohio GAP analysis.

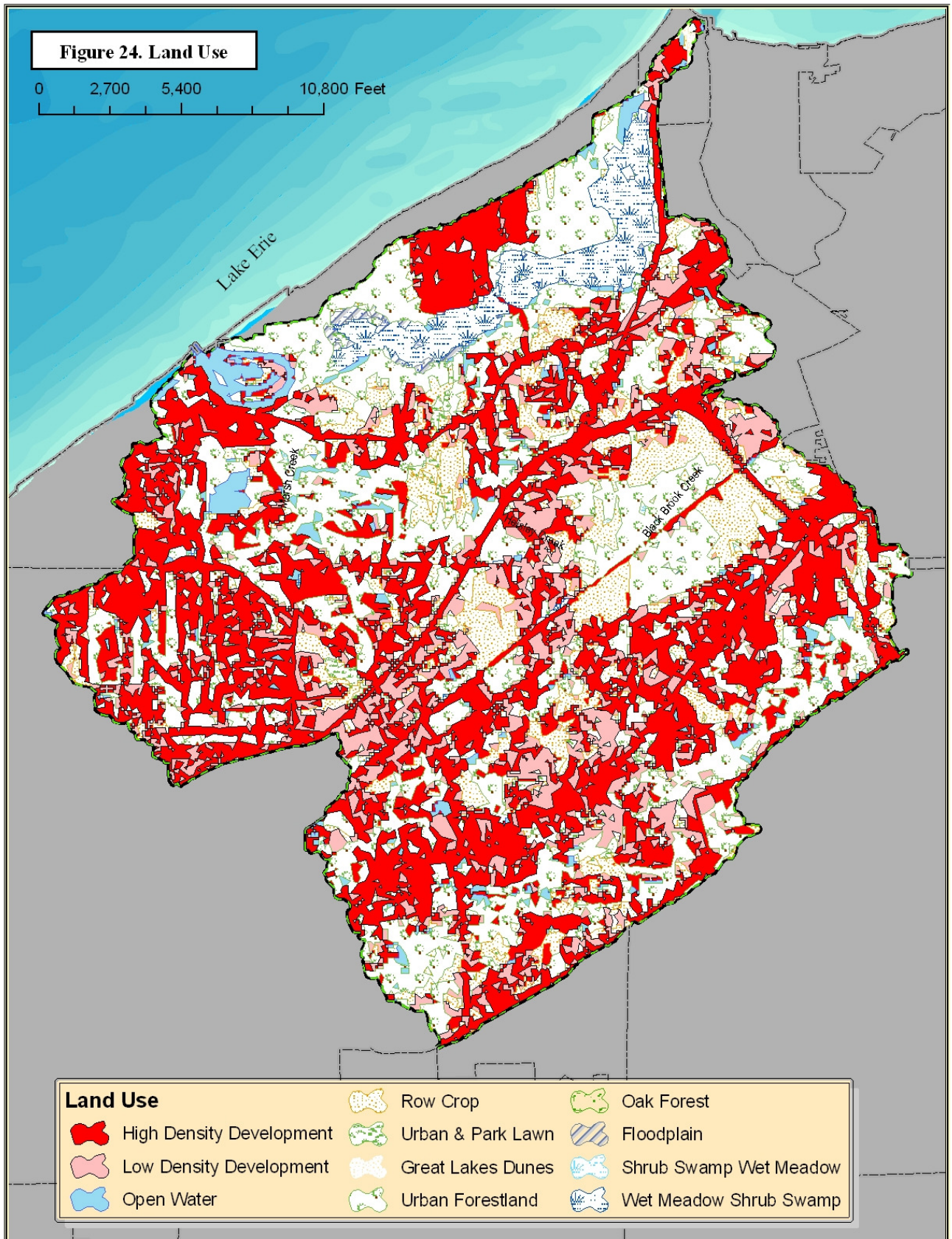
Table. 25 Land Use / Land Cover

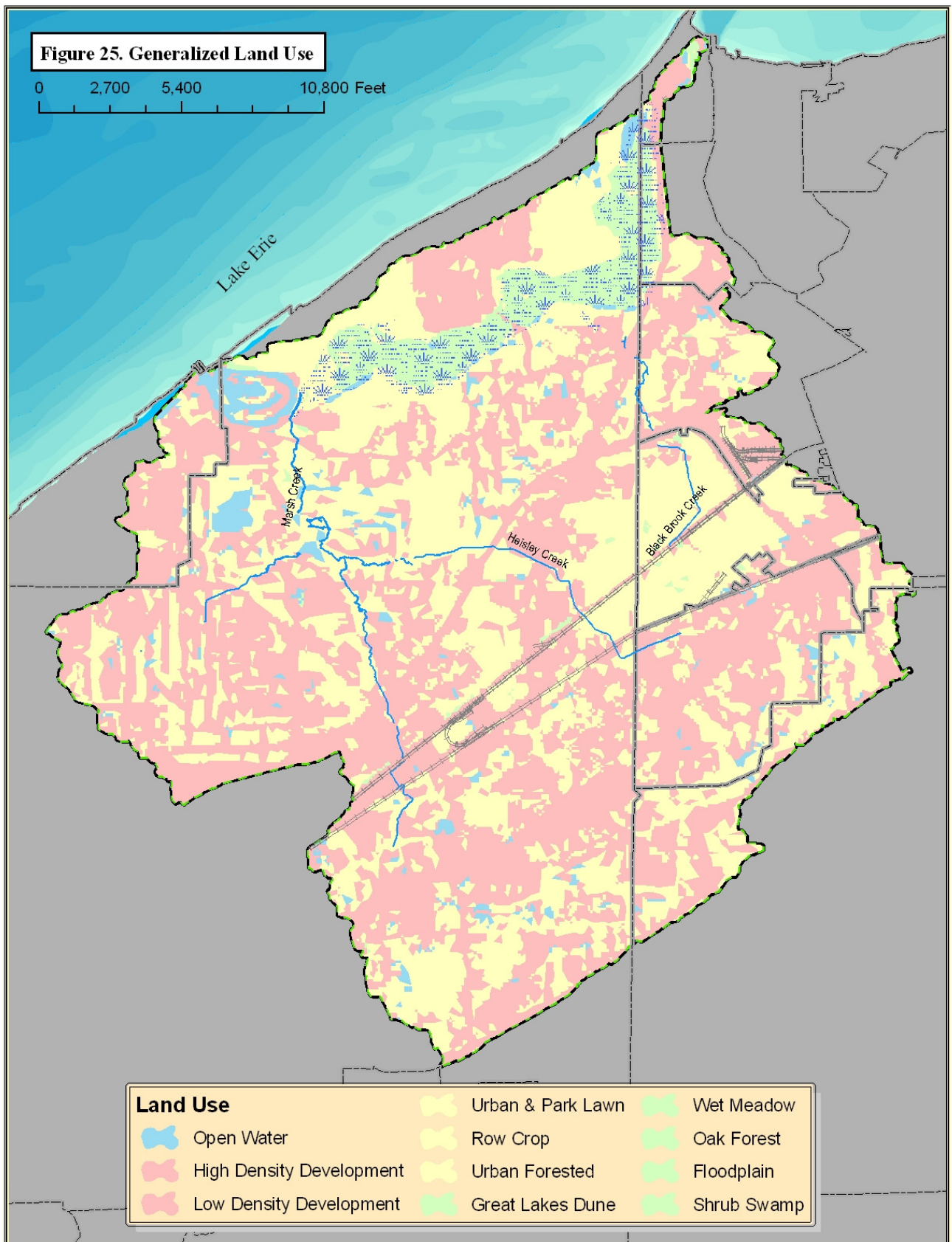
Open water	410.09-acres	2.84%
Row Crop	1808.62-acres	12.51%
HD Development	5379.63-acres	37.20%
LD Development	1933.69-acres	13.37%
Urban/Park Lawn	127.38-acres	0.88%
Urban Forested	4148.17-acres	28.69%
Great Lakes Dune	6.50-acres	0.04%
Wet Meadow	574.34-acres	3.97%
Oak Forest	2.17-acres	0.02%
Floodplain	59.57-acres	0.41%
Shrub Swamp	10.92-acres	0.08%

Figure 24 shows the Ohio GAP Analysis of land use in Lake County. A more generalized view of the land use, merging like land uses is shown in Figure 25. Current land use in the watershed, as well as future conditions are discussed in detail in Section 6, Mentor Marsh Watershed Impairments and Problems Summary.

Impervious Cover

In order to calculate the amount of impervious cover in the watershed, data from adjacent watersheds, census tract data, and photo-interpretation were all used. Portions of the impervious cover have already been mapped and calculated in Mentor-On-The-Lake, Grand River, Concord Township, and Painesville Township. These communities participate in the Lake County Stormwater Management District (LCSMD), who has mapped all non-residential impervious cover with the use of high resolution orthophotography. The amount of residential impervious cover was calculated by multiplying the number of houses located in these communities by an Equivalent Residential Unit (3050 square feet). Research by the LCSMD indicates that an average of 3050 square feet of impervious cover is present per household across the county. By combining these two figures the amount of impervious cover is closely approximated. Painesville Township and Grand River were calculated together. The value for the number of houses was not available per community, only the sum of the both communities together. No data was available for the City of Mentor or the City of Painesville from the LCSMD. However, the Chagrin River Watershed Partners conducted an impervious cover study of the Chagrin River





Watershed. The watershed includes portions of Mentor, which was calculated as having 18.8% impervious cover. (CRWP, 2004) The amount of development in the City of Mentor, in these two watersheds, is largely similar. (Figure 26) Applying the same % of impervious cover in the City of Mentor portion of the watershed is justifiable.

The amount of impervious cover for the City of Painesville was calculated using photo-interpretation with high resolution orthophotography.

The amount of impervious cover is shown in Figure 27. This map does not contain large paved areas or similar impervious covered surfaces in the City of Mentor. Figure 27 does contain all impervious surfaces; including building footprints, railroads, roads, and parking areas in the remainder of the watershed.

Table 26. Impervious Cover

Community	Area In Watershed (Acres)	Impervious Area in Community (Acres)	% of each Community
City of Mentor	10318.78	1939.93	18.8%
City of Painesville	915.78	71.5	7.8%
Concord Twp	759.57	331.93	43.7%
Painesville Twp and Grand River	2065.30	415.25	20.1%
Mentor on the Lake	393.26	179.80	45.7%
Totals/Average	14452.69-acres	2938.41-acres	20.3%

208 Water Quality Management Plans

A 208 Water Quality Management Plan has been completed for all areas of the watershed. The Clean Water 2000 document completed by the Northeast Ohio Areawide Coordinating Agency (NOACA) completed this plan in November, 2000 to comply with the Clean Water Act. All areas, with the exception of a portion of the City of Painesville are considered to be “Areas Currently Sewered”. The land west of State Route 44 to the City of Painesville and Mentor boundary, and south of State Route 2 to Jackson Street is considered to be “Limited Sewering likely within 20 years”. Clean Water 2000 focuses on issues of planned sewer expansions, better management of home sewage treatment systems (HSTS), more vigorous attention to the control of non-point source pollution, and protection of the region’s critical water resources. Figure 28 shows the location of the waste water treatment plant in the watershed.

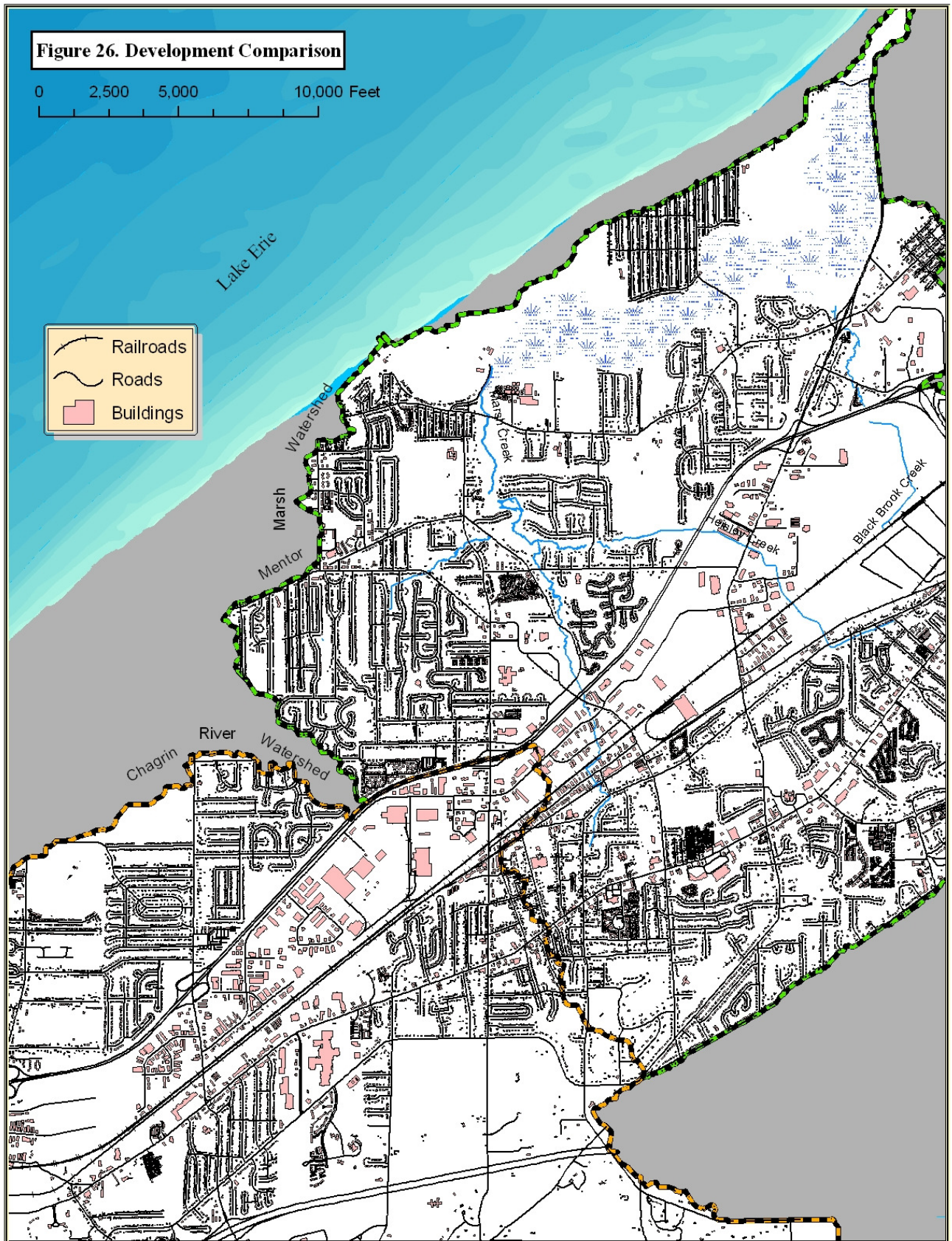
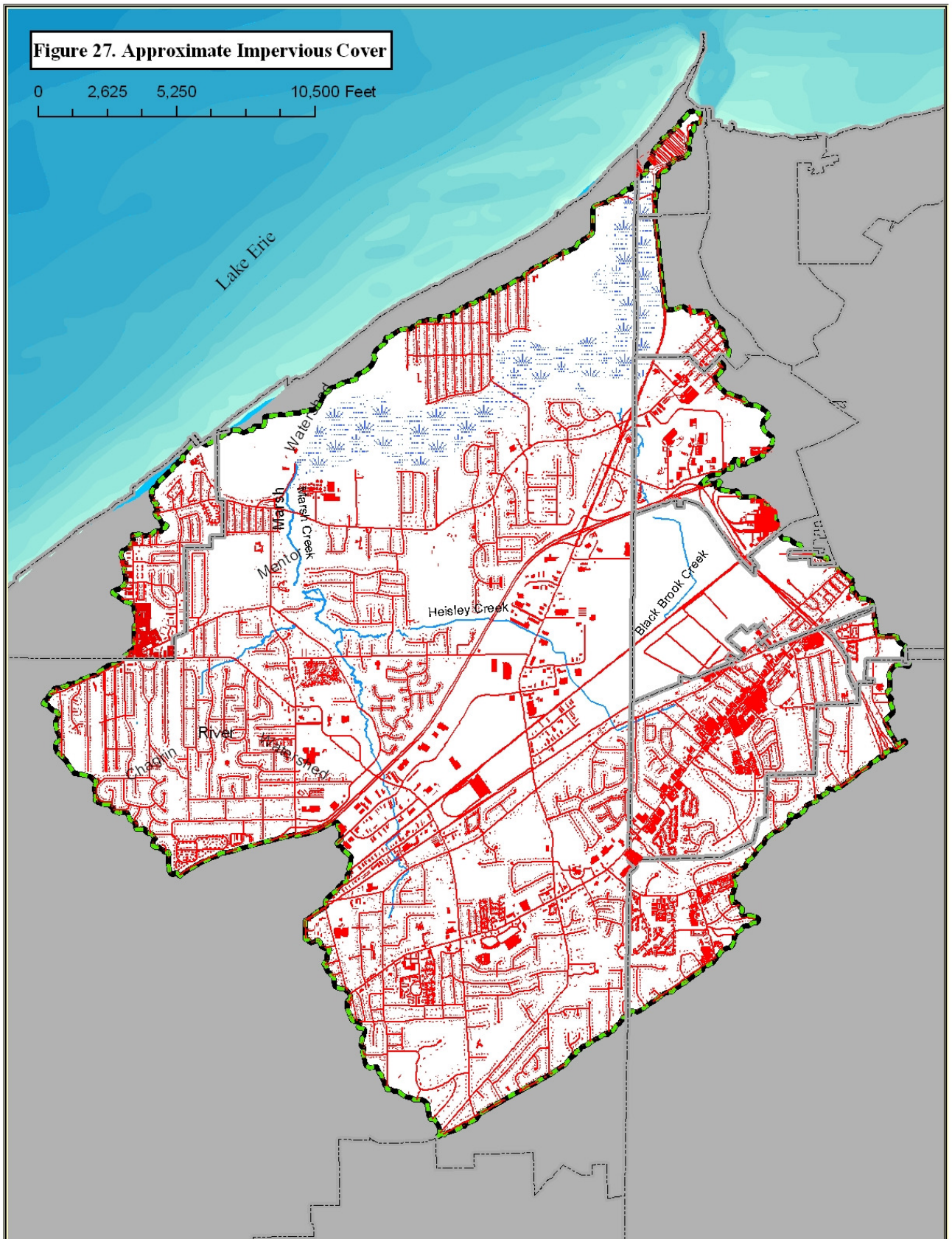
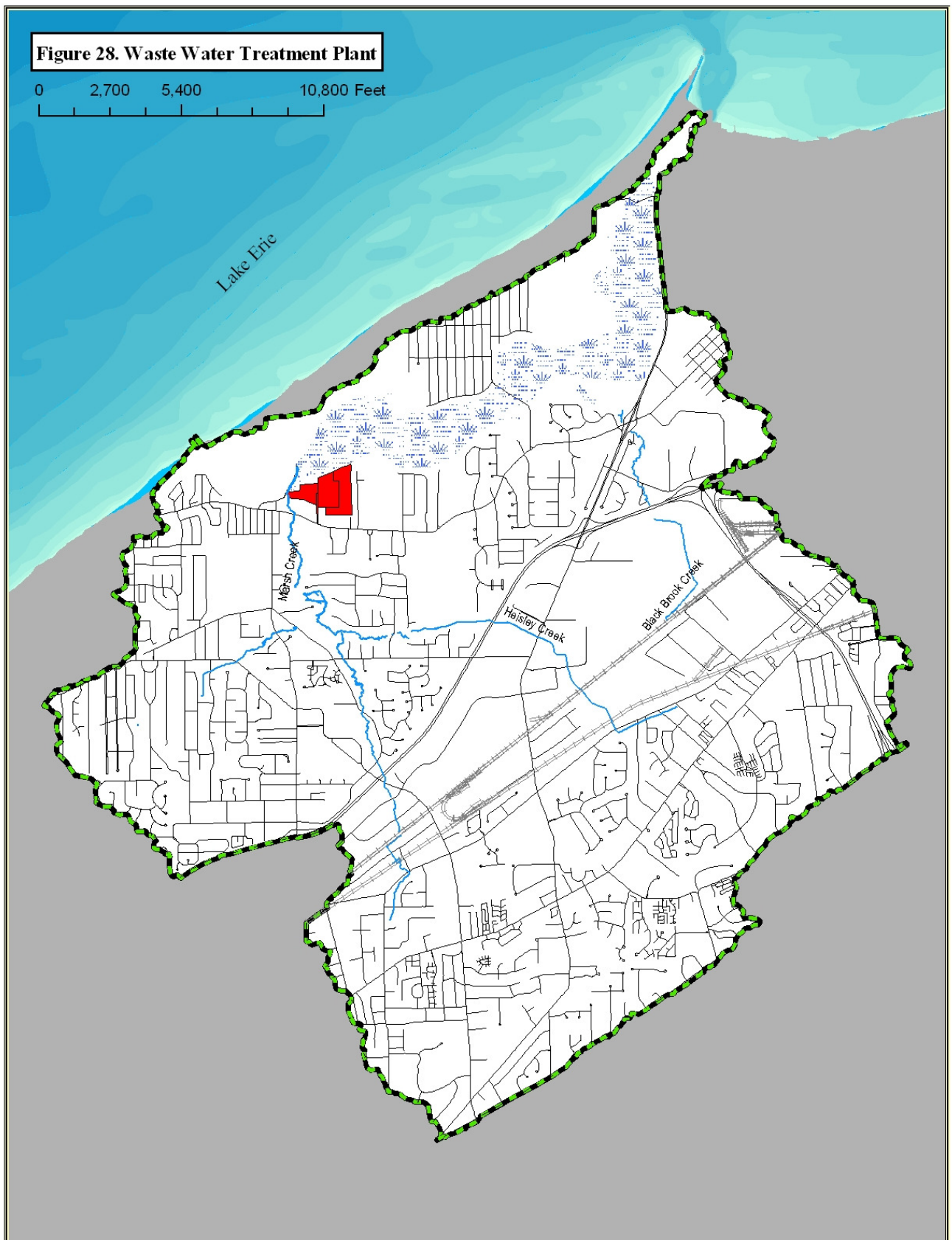


Figure 27. Approximate Impervious Cover

0 2,625 5,250 10,500 Feet





Park Districts and Protected Property

Lake Metroparks

Lake Metroparks Veteran's Park is a 100-acre park located in Mentor and Mentor-on-the-Lake. Portions of the land that makes up the park are owned by the Mentor Board of Education, the City of Mentor, and the City of Mentor-on-the-Lake. The park district maintains lease-management agreements with each of these entities. Veterans Park, which lies in the Marsh Creek drainage, features a 21-acre lake used extensively by wildlife and anglers. Amenities include a picnic shelter, restrooms, trails, a playground and fishing piers. 2005 saw 173,900 visitations to the park (Vince Urbanski, pers. comm.)

ODNR-DNAP

The Division of Natural Areas and Preserves, in addition to separate easements and management agreements, operates two State Nature Preserves in the watershed. The Headlands Dunes State Nature Preserve is a 24-acre property located in the northeastern most portion of the watershed. This property exhibits a lake shore dune ecosystem that contains numerous threatened or potentially threatened species. The Mentor Marsh State Nature Preserve is a 646-acre property located in the central portion of the watershed near Corduroy Road. This property contains large amounts of the marsh and upland buffer areas. Similar to Headlands Dunes SNP, the Mentor Marsh SNP also contains numerous threatened, potentially threatened, or endangered species.

ODNR-Parks and Recreation

Portions of Headlands Beach State Park are located in the watershed. The park is located in the City of Mentor on Headlands Road. The park offers a mile-long beach along Lake Erie, fishing, picnicking, hunting, a picnic shelter, sledding, and cross-country skiing. The park is approximately 120-acres and is adjacent to the Headlands Dunes State Nature preserve.

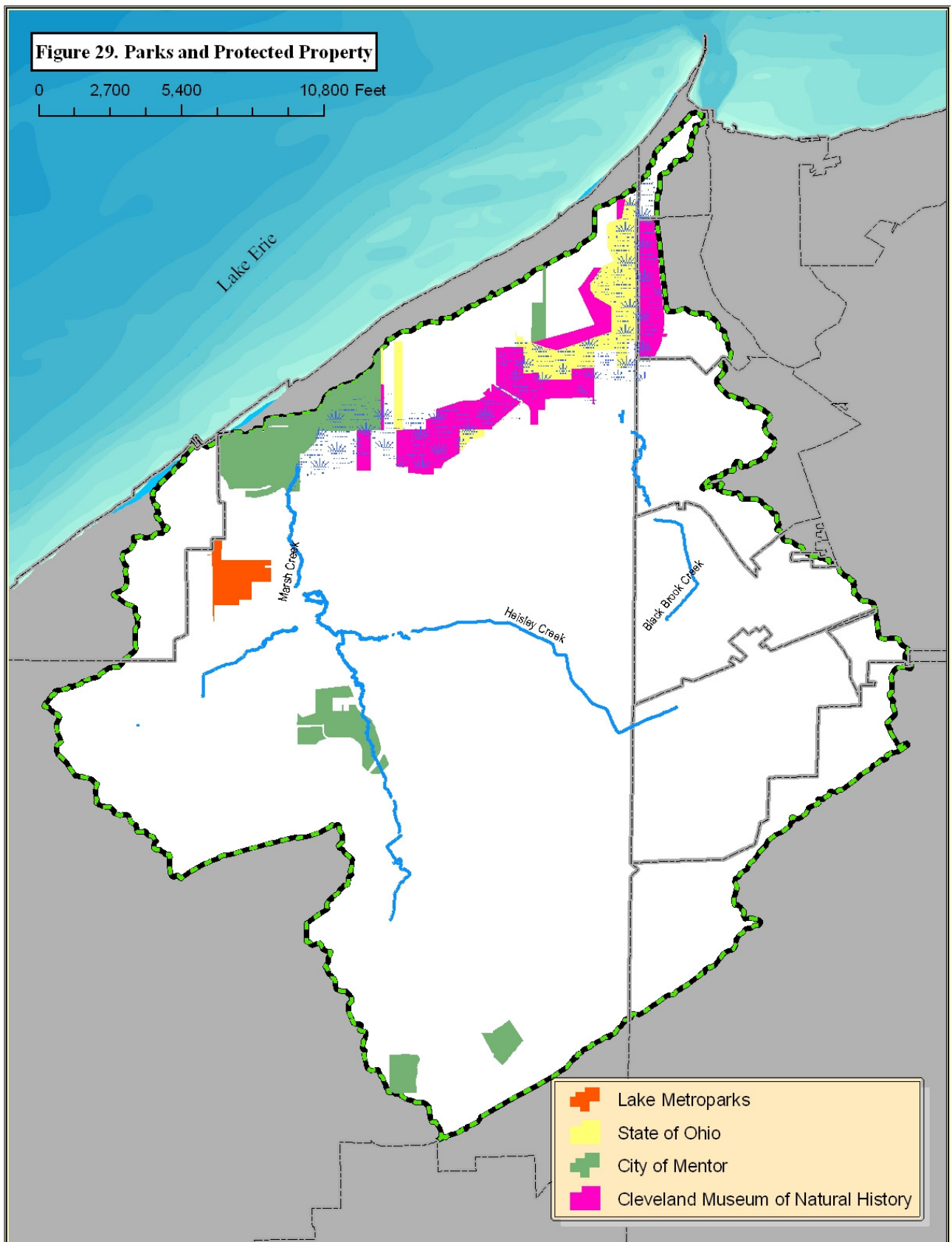
Cleveland Museum of Natural History

The Cleveland Museum of Natural History has been very aggressive in acquiring lands throughout northeast Ohio that exhibit outstanding or rare habitats. They currently own 691-acres in the watershed and manage over 50-acres owned by the State of Ohio.

Mentor Community Parks

Mentor Community Parks are properties managed by the City of Mentor for recreation; specifically picnic areas, playgrounds, fishing ponds, hiking, fitness and bike trails, swimming pools, skate parks, spray parks, tennis and basketball courts, and athletic fields. Parks located within the watershed include Morton Community Park, Tiefenbach Memorial Park, Mentor Lagoons Nature Preserve & Marina, Wildwood Park, Krueger Park, Civic Center Park, and Dog Park. The City of Mentor has recently acquired additional natural areas along Jordan Road.

Figure 29 shows the extent and ownership of these parks and protected properties in the watershed.



Cultural Resources

The following information on cultural resources was prepared by the Lake County Historical Society.

National Register of Historic Places

Information about local sites on the National Register of Historic Places may be found at the following web site: <http://dbs.ohiohistory.org/hp/index.cfm>

The Norma Grantham site is a prehistoric Native American village site. At least two additional prehistoric Native American village sites have been partially explored in the Headlands area of the Mentor Marsh watershed by the Cleveland Museum of Natural History.

The Mentor Marsh was declared a National Natural landmark in 1966 by the US Department of the Interior and there is a marker to this effect at the Zimmerman Trail head near Headlands Road.

Information below has been reproduced from the National Register of Historic Places web site.

Mentor



REFNUM: 66000613
RESNAME: James A. Garfield National Historic Site
ADDRESS: 8095 Mentor Ave.
RETYPECD: B
NUMCBLDG: 4
NUMCSITE: 0
NUMCSTRC: 1
NUMCOBJ: 0
NUMNBLDG: 1

NUMNSITE: 0
NUMNSTRC: 0
NUMNOBJ: 0
CERTCD: LI
CERTDATE: 19661015
MULTNAME:
OTHRNAME: Garfield,James A.,Home;Lawnfield;Dickey Farm;James A. Garfield
SIGNAME: Garfield,James Abram
AREA OF SIGNIFICANCE: POLITICS/GOVERNMENT
Cultural Affiliation:
Architect:Unknown
Criterion: PERSON
Criteria:
Material: NONE LISTED FOUN NONE LISTED ROOF NONE LISTED
OTHR WEATHERBOARD OTHR
Historic Use: DOMESTICCOMMERCE/TRADE
Historic Secondary Use: SINGLE DWELLINGPROFESSIONALSECONDARY STRUCTURE
Current Use: RECREATION AND CULTURE
Current Secondary Use: MUSEUM
Architectural Style : NO STYLE LISTED
Resource Type: BUILDING
City: Mentor
County: Lake



REFNUM: 72001027
RESNAME: Corning-White House
ADDRESS: 8353 Mentor Ave.
RETYPECD: B
NUMCBLDG: 1
NUMCSITE: 0
NUMCSTRC: 0
NUMCOBJ: 0
NUMNBLDG: 0
NUMNSITE: 0

NUMNSTRC: 0
NUMNOBJ: 0
CERTCD: LI
CERTDATE: 19721107
MULTNAME:
OTHRNAME:
SIGNAME:
AREA OF SIGNIFICANCE: ARCHITECTURE
Cultural Affiliation:
Architect: Goldsmith,Jonathan
Criterion: ARCHITECTURE/ENGINEERING
Criteria:
Material: NONE LISTED FOUN NONE LISTED ROOF NONE LISTED
OTHR WEATHERBOARD OTHR
Historic Use: DOMESTIC
Historic Secondary Use: SINGLE DWELLING
Current Use: VACANT/NOT IN USE
Current Secondary Use:
Architectural Style : FEDERAL
Resource Type: BUILDING
City: Mentor
County: Lake



REFNUM: 74001542
RESNAME: Sawyer-Wayside House
ADDRESS: 9470 Mentor Ave.
RETYPECD: B
NUMCBLDG: 1
NUMCSITE: 0
NUMCSTRC: 0
NUMCOBJ: 0
NUMNBLDG: 0
NUMNSITE: 0
NUMNSTRC: 0

NUMNOBJ: 0
CERTCD: LI
CERTDATE: 19741029
MULTNAME:
OTHRNAME:
SIGNAME:
AREA OF SIGNIFICANCE: ARCHITECTURE
Cultural Affiliation:
Architect: Unknown
Criterion: ARCHITECTURE/ENGINEERING
Criteria:
Material: STONE FOUN NONE LISTED ROOF WOOD OTHR STONE OTHR
Historic Use: DOMESTIC
Historic Secondary Use: SINGLE DWELLING
Current Use: COMMERCE/TRADE
Current Secondary Use: BUSINESS
Architectural Style: NO STYLE LISTED
Resource Type: BUILDING
City: Mentor
County: Lake



REFNUM: 75001452
RESNAME: Gray-Coulton House
ADDRESS: 8607-8617 Mentor Ave.
RETYPECD: B
NUMCBLDG: 4
NUMCSITE: 0
NUMCSTRC: 0
NUMCOBJ: 0
NUMNBLDG: 0
NUMNSITE: 0
NUMNSTRC: 0
NUMNOBJ: 0
CERTCD: LI

CERTDATE: 19751203
MULTNAME:
OTHRNAME:
SIGNAME:
AREA OF SIGNIFICANCE:ARCHITECTURE
Cultural Affiliation:
Architect: Gray,Martin
Criterion: ARCHITECTURE/ENGINEERING
Criteria:
Material: STONE FOUN OTHER ROOF NONE LISTED OTHR NONE LISTED OTHR
Historic Use: DOMESTICCOMMERCE/TRADE
Historic Secondary Use: SINGLE DWELLINGSPECIALTY STORE
Current Use: DOMESTICCOMMERCE/TRADE
Current Secondary Use: SINGLE DWELLINGBUSINESS
Architectural Style: ITALIANATE
Resource Type: BUILDING
City: Mentor
County: Lake



REFNUM: 75001453
RESNAME: Mason, James, House
ADDRESS: 8125 Mentor Ave.
RETYPECD: B
NUMCBLDG: 1
NUMCSITE: 0
NUMCSTRC: 0
NUMCOBJ: 0
NUMNBLDG: 0
NUMNSITE: 0
NUMNSTRC: 0
NUMNOBJ: 0
CERTCD: LI
CERTDATE: 19750918
MULTNAME:

OTHRNAME:
SIGNAME:
AREA OF SIGNIFICANCE: ARCHITECTURE
Cultural Affiliation:
Architect: Goldsmith,Jonathan
Criterion: ARCHITECTURE/ENGINEERING
Criteria:
Material: NONE LISTED FOUN NONE LISTED ROOF NONE LISTED
OTHR WEATHERBOARD OTHR
Historic Use: DOMESTIC
Historic Secondary Use: SINGLE DWELLING
Current Use: RELIGION
Current Secondary Use:
Architectural Style : NO STYLE LISTED
Resource Type: BUILDING
City: Mentor
County: Lake

NO PHOTO AVAILABLE
REFNUM: 78002092
RESNAME: Lake Shore and Michigan Southern RR Depot and Freight House
ADDRESS: 8445 Station St.
RETYPECD: B
NUMCBLDG :2
NUMCSITE: 0
NUMCSTRC: 0
NUMCOBJ: 0
NUMNBLDG: 0
NUMNSITE: 0
NUMNSTRC: 0
NUMNOBJ: 0
CERTCD: LI
CERTDATE: 19780131
MULTNAME:
OTHRNAME: Mentor Railroad Station
SIGNAME:
AREA OF SIGNIFICANCE: ARCHITECTURE
Cultural Affiliation:
Architect: Unknown
Criterion: ARCHITECTURE/ENGINEERING
Criteria:
Material: LIMESTONE FOUN SLATE ROOF WOOD OTHR STONE OTHR STONE
OTHR BRICK OTHR
Historic Use: TRANSPORTATION
Historic Secondary Use: RAIL-RELATED
Current Use: COMMERCE/TRADE
Current Secondary Use:
Architectural Style : NO STYLE LISTED
Resource Type: BUILDING
City: Mentor
County: Lake

NO PHOTO AVILABLE

REFNUM: 79001872

RESNAME: Garfield Library

ADDRESS: 7300 Center St.

RETYPECD: B

NUMCBLDG: 1

NUMCSITE: 0

NUMCSTRC: 0

NUMCOBJ: 0

NUMNBLDG: 0

NUMNSITE: 0

NUMNSTRC: 0

NUMNOBJ:

CERTCD: LI

CERTDATE: 19790223

MULTNAME:

OTHRNAME:

SIGNAME:

AREA OF SIGNIFICANCE: ARCHITECTURE

Cultural Affiliation:

Architect: Garfield,Abram

Criterion: ARCHITECTURE/ENGINEERING

Criteria:

Material: NONE LISTED FOUN NONE LISTED ROOF NONE LISTED OTHR BRICK OTHR

Historic Use: EDUCATION

Historic Secondary Use: LIBRARY

Current Use: COMMERCE/TRADE

Current Secondary Use: BUSINESS

Architectural Style: CLASSICAL REVIVAL

Resource Type: BUILDING

City: Mentor

County: Lake

NO PHOTO AVAILABLE

REFNUM: 94000240

RESNAME: Yager, John and Carrie, House

ADDRESS: 7612 S. Center St.

RETYPECD: B

NUMCBLDG: 2

NUMCSITE: 0

NUMCSTRC: 3

NUMCOBJ: 0

NUMNBLDG: 0

NUMNSITE: 0

NUMNSTRC: 0

NUMNOBJ: 0

CERTCD: LI

CERTDATE: 19940317

MULTNAME:

OTHRNAME: Wickert,Ruth,House;LAK-98-3

SIGNAME:
AREA OF SIGNIFICANCE: ARCHITECTURE
Cultural Affiliation:
Architect: Yager, John
Criterion: ARCHITECTURE/ENGINEERING
Criteria:
Material: STONE FOUN ASPHALT ROOF INAPPLICABLE OTHR STONE OTHR STUCCO
OTHR
Historic Use: DOMESTIC
Historic Secondary Use: SINGLE DWELLINGSECONDARY STRUCTURE
Current Use: DOMESTIC
Current Secondary Use: SINGLE DWELLINGSECONDARY STRUCTURE
Architectural Style : BUNGALOW/CRAFTSMAN
Resource Type: BUILDING
City: Mentor
County: Lake

NO PHOTO AVAILABLE
REFNUM: 96000867
RESNAME: Young, Benjamin and Mary, House
ADDRESS: 7597 S. Center St.
RETYPECD: B
NUMCBLDG: 1
NUMCSITE: 0
NUMCSTRC: 0
NUMCOBJ: 0
NUMNBLDG: 0
NUMNSITE: 0
NUMNSTRC: 0
NUMNOBJ: 0
CERTCD: LI
CERTDATE: 19960808
MULTNAME:
OTHRNAME: Rhoda Corning Holmes House;LAK-95-3
SIGNAME:

AREA OF SIGNIFICANCE: ARCHITECTURE
Cultural Affiliation:
Architect: Unknown
Criterion: ARCHITECTURE/ENGINEERING
Criteria: MOVED PROPERTY
Material: CONCRETE FOUN ASPHALT ROOF NONE LISTED OTHR WOOD OTHR
Historic Use: DOMESTIC
Historic Secondary Use: SINGLE DWELLING
Current Use: DOMESTIC
Current Secondary Use: SINGLE DWELLING
Architectural Style: FEDERAL
Resource Type: BUILDING
City: Mentor
County: Lake

Fairport Harbor



REFNUM: 71000642

RESNAME: Fairport Marine Museum

ADDRESS: 129 2nd St.

RETYPECD: U

NUMCBLDG: 1

NUMCSITE: 0

NUMCSTRC: 1

NUMCOBJ 0

NUMNBLDG: 0

NUMNSITE: 0

NUMNSTRC: 0

NUMNOBJ: 0

CERTCD: LI

CERTDATE: 19711105

MULTNAME:

OTHRNAME: Fairport Harbor Coast Guard Light Station Reservation

SIGNAME:

AREA OF SIGNIFICANCE: COMMERCEENGINEERING

Cultural Affiliation:

Architect:

Criterion: EVENTARCHITECTURE/ENGINEERING

Criteria:

Material: NONE LISTED FOUN NONE LISTED ROOF NONE LISTED OTHR BRICK

OTHR SANDSTONE OTHR

Historic Use: TRANSPORTATION

Historic Secondary Use: WATER-RELATED

Current Use: RECREATION AND CULTURE

Current Secondary Use: MUSEUM

Architectural Style: NO STYLE LISTED

Resource Type: STRUCTURE

City: Fairport Harbor

County: Lake

NO PHOTO AVAILABLE

REFNUM: 84003757

RESNAME: Grantham, Norma, Site (33-La-139)

ADDRESS: Address Restricted

RETYPECD: S

NUMCBLDG: 0

NUMCSITE: 1

NUMCSTRC: 0

NUMCOBJ: 0

NUMNBLDG: 0

NUMNSITE: 0

NUMNSTRC: 0

NUMNOBJ: 0

CERTCD: LI

CERTDATE: 19840531

MULTNAME:

OTHRNAME:33-La-139

SIGNAME:

AREA OF SIGNIFICANCE:PREHISTORIC

Cultural Affiliation: Whittlesey Late Woodland

Architect:

Criterion: INFORMATION POTENTIAL

Criteria:

Material: INAPPLICABLE FOUN INAPPLICABLE ROOF INAPPLICABLE

OTHR INAPPLICABLE OTHR

Historic Use: DOMESTICFUNERARY

Historic Secondary Use: VILLAGE SITEGRAVES/BURIALS

Current Use: COMMERCE/TRADE

Current Secondary Use:

Architectural Style :

Resource Type: SITE

City: Fairport Harbor

County: Lake

NO PHOTO AVAILABLE

REFNUM: 92000242

RESNAME: Fairport Harbor West Breakwater Light

ADDRESS: W breakwater pierhead, harbor entrance

RETYPECD: U

NUMCBLDG: 0

NUMCSITE: 0

NUMCSTRC: 1

NUMCOBJ: 0

NUMNBLDG: 0

NUMNSITE: 0

NUMNSTRC: 0

NUMNOBJ: 0

CERTCD: LI

CERTDATE: 19920410

MULTNAME: Light Stations of Ohio Multiple Property Submission

OTHRNAME:
SIGNAME:
AREA OF SIGNIFICANCE: ARCHITECTURETRANSPORTATION
Cultural Affiliation:
Architect: Unknown
Criterion: EVENTARCHITECTURE/ENGINEERING
Criteria:
Material: CONCRETE FOUN STEEL ROOF NONE LISTED OTHR STEEL OTHR
Historic Use: TRANSPORTATION
Historic Secondary Use: WATER-RELATED
Current Use: TRANSPORTATION
Current Secondary Use: WATER-RELATED
Architectural Style: OTHER
Resource Type: STRUCTURE
City: Fairport Harbor
County: Lake

Ohio Historic Inventory

Additional information on local Lake County History may be obtained from the Lake County Historical Society at their web site; <http://www.lakehistory.org/>.

There are seven historic markers with in and adjacent to the Mentor Marsh Watershed. Information concerning the markers is copied below from the remarkableohio.org website listed below by searching by zip codes, 44060, 44077 and 44045.

http://www.remarkableohio.org/index.cfm?action=search_markers.basic_search

OHIO HISTORICAL MARKERS

La Salle Expedition, 1669 : Marker #20-43

In search of a westward-flowing river, French explorer and trader René-Robert Cavelier, Sieur de La Salle (1643-1687) mounted an inland expedition from the south shore of Lake Erie at the mouth of the Grand River in the fall of 1669. Thought to be the first European to see the Ohio River, La Salle journeyed up the Grand River and portaged to a tributary of the Ohio; from there he descended as far as the falls at Louisville, Kentucky. La Salle's explorations both expanded the fur trade and helped to consolidate French claims to the Mississippi River valley. French dominance in Ohio ended following British victory in the French and Indian War (1754-1763).

County

Lake

Address

301 Huntington Beach Drive
Fairport Harbor, OH 44077

Directions

Fairport Harbor Lakefront Park, 301 Huntington Beach Dr.

Latitude / Longitude

41.758149 ° / -81.2774 °

Category(s)

Community Planning/Development (CPD)

Keyword(s)

"Discovery & exploration"

Sponsor(s)

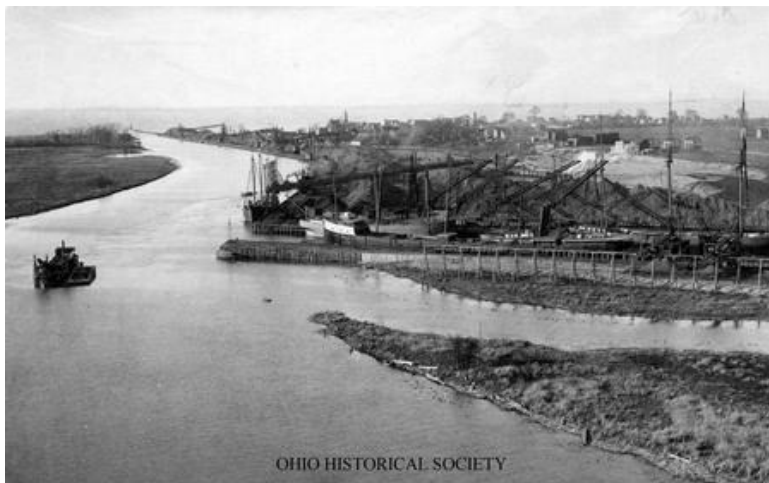
Ohio Bicentennial Commission, The Marietta Chapter NSDAR, Lake County Historical Society, and The Ohio Historical Society

Year

2003

Condition

New

Fairport Harbor Lighthouse : Marker #5-43

Lighthouse and keeper's dwelling, erected in 1871 to replace the 1825 structures designed by Jonathan Goldsmith. From the time it guided early settlers into the Western Reserve until it was decommissioned in 1925, this station served Great Lakes shipping for its most important 100 years. The present, well-proportioned tower, constructed of Berea sandstone, is an outstanding engineering achievement.

County

Lake

Address

129 2nd Street
Fairport Harbor, OH 44077

Directions

Fairport Marine Museum, 129 Second Street

Latitude / Longitude

41.756846 ° / -81.278 °

Category(s)

Architecture (ACH), Natural History/Geologic Site (NAT), Transportation (TRA)

Keyword(s)

"Lighthouses", "Rivers"

Sponsor(s)

The Fairport Harbor Historical Society and The Ohio Historical Society

Year

1971

Condition

Unknown

James A. Garfield : Marker #2-43



His oratorical powers made him a master recruiter. His willingness to learn earned him important field commands. His talents for organization won him praise, distinction and the rank of major general at the Battle of Chickamauga. His gallant and meritorious military successes launched him into national politics and the presidency.

County

Lake

Address

8095 Mentor Avenue
Mentor, OH 44060

Directions

Lawnfield Historic Site, 8095 Mentor Avenue, Mentor

Latitude / Longitude

41.663774 ° / -81.35052 °

Category(s)

Military (MIL), Politics/Government (POL)

Keyword(s)

"Civil War", "Presidents"

Sponsor(s)

The Ohio Historical Society and the Ohio Civil War Centennial Commission

Year

1965

Condition

Unknown

Mentor Avenue Historic District : Marker #10-43

Among the fifty-four buildings that comprise the Mentor Avenue District are examples of Federal, Greek Revival, Early Romanesque Revival, Italianate, Second Empire, Queen Anne, and twentieth century eclectic styles. Renowned master builder Jonathan Goldsmith (1783-1847), whose Federal and Greek Revival designs define the so-called "Western Reserve" style, built at least two of these houses; the Denton-Powers House (ca. 1820) is representative. The Mentor Avenue District was added to the National Register of Historic Places in 1979. The Painesville City Hall, the Sessions House (157 Mentor Avenue) and the Smead House (187 Mentor Avenue) are also listed individually on the National Register.

County

Lake

Address

143 Mentor Avenue
Mentor, OH 44060

Directions

30435 Lakeshore Boulevard

Latitude / Longitude

41.650046 ° / -81.38193 °

Category(s)

Historic District (HST)

Keyword(s)

"Cities", "Neighborhoods"

Sponsor(s)

Ohio Bicentennial Commission, The Longaberger Company, Lake Metroparks, City of Willowick, The Lake County Historical Society, and The Ohio Historical Society

Year

2000

Condition

Unknown

Mentor Lagoons : Marker #17-43

For over 200 years, the Mentor Lagoons have had a major impact on northeastern Ohio and its people. Located on the site of a large estuary where the Grand River once flowed into Lake Erie, the area evolved into a large marsh. It was here in 1797 that Charles Parker, a member of Moses Cleaveland's survey party, platted lands for the Connecticut Land Company and established the "Marsh Settlement," the first in what later became Lake County. Throughout the twentieth century, attempts were made to commercially develop this natural treasure, the most recent occurring in 1996. The proposed destruction of the Mentor Lagoons' pristine lakefront, upland forest and riverine marsh prompted Mentor voters to call for its preservation. For the first time in Ohio's history, voters affirmed eminent domain action to protect open space. This led to the city's acquisition of the 450-acre tract, now known as the Mentor Lagoons Nature Preserve & Marina.

County

Lake

Address

8365 Harbor Drive
Mentor, OH 44060

Directions

8365 Harbor Drive

Latitude / Longitude

41.722196 ° / -81.34041 °

Category(s)

Natural History/Geologic Site (NAT)

Keyword(s)

"Estuaries"

Sponsor(s)

Ohio Bicentennial Commission, The Longaberger Company, City of Mentor, and The Ohio Historical Society

Year

2002

Condition

New

Rose Capital of The Nation : Marker #19-43

From the 1920s through the 1970s, Mentor was recognized as the Rose Capital of the Nation. Lake effect climate, a variety of soils, and abundant water made Mentor ideal for growing roses. Over a dozen growers produced about five million plants a year from their fields in Mentor. The Civic Center Complex was once a massive field of roses, and streets such as Tea Rose, Wyant, and Rosebud were named in honor of the blossoms that grew so abundantly here. Notable growers include Gerard K. Klyn, the largest rose grower in the Midwest; Joseph Kallay, who in 1932 received U.S. patent No. 10 for "Blaze;" Melvin E. Wyant, accredited rose grower, judge, and lecturer; Joseph J. Kern, nationally recognized expert on old fashioned roses; and Paul R. Bosley, who specialized in hybrid tea roses. By the 1970s, increased land values and development led to depletion of much of Mentor's nursery lands.

County

Lake

Address

8537 Mentor Avenue
Mentor, OH 44060

Directions

Commemorative Rose Garden, 8537 Mentor Ave.

Latitude / Longitude

41.668433 ° / -81.33484 °

Category(s)

Agriculture (AGR)

Keyword(s)

"Horticulture"

Sponsor(s)

Ohio Bicentennial Commission, The Longaberger Company, City of Mentor, and The Ohio Historical Society

Year

2003

Condition

New

Thomas W. Harvey (1821-1892) : Marker #11-43

This Italianate-style house is the former home of noted educational leader Thomas W. Harvey. Here he wrote A Practical Grammar of the English Language, as well as a series of language texts and readers. First published in 1868, Harvey's Grammar was a fixture in primary schools across the Midwest for more than fifty years. As State Commissioner of Common Schools, Harvey advocated legislation that greatly increased state support of local school districts. He also served as superintendent of Painesville schools, founded the Northeastern Ohio Teachers' Association, and served as a trustee of Lake Erie Seminary (now Lake Erie College). Painesville's high school, located one block southeast, is named for him.

County

Lake

Address

143 Mentor Avenue
Mentor, OH 44060

Directions

143 Mentor Avenue

Latitude / Longitude

41.650046 ° / -81.38193 °

Category(s)

Architecture (ACH), Education (EDU)

Keyword(s)

"Houses", "Public Schools"

Sponsor(s)

Ohio Bicentennial Commission, The Longaberger Company, The Painesville City Improvement Corporation, and The Ohio Historical Society

Year

2000

Condition

Unknown

Ohio Archaeological Inventory

At least three prehistoric Indian villages/sites in or near the Mentor Marsh watershed have been explored in recent years. Prehistoric Indian artifacts may be viewed at the local Indian Museum in Willoughby and at the Cleveland Museum of Natural History.

The Ohio Historical society has an excellent document detailing the relationship between wetlands and archeological sites. This document can be viewed at:

<http://www.ohiohistory.org/resource/histpres/toolbox/wetarch.html>

Mentor Marsh Watershed Impairments and Problems

Summary

“This area contains a number of unique ecosystems. Mentor Marsh State Nature Preserve, previously identified as a National Natural Landmark, is currently undergoing hydrologic changes and degradation from water quality impairment and the introduction of exotic species. The area also boasts the last remaining large undeveloped beach on Ohio’s Lake Erie shoreline that supports a diverse ecological community and that serves a valuable natural protective function in an area subject to erosion.” (Davey Resources, 2001)

The Mentor Marsh watershed is located within the Ohio Lake Basin and therefore must apply management measures specific to the Ohio Coastal Nonpoint Pollution Control Program that satisfy Appendix 8 of “A Guide to Developing Local Watershed Action Plans in Ohio”. The following problem statements and restoration goals that satisfy Appendix 8 Management Measures of the Ohio Coastal Nonpoint Pollution Control Program will be numbered accordingly. Many of these measures are not applicable to this watershed action plan.

Non-Applicable Appendix 8 Management Measures of the Ohio Coastal Nonpoint Pollution Control Program

Agriculture (3.3.7) Irrigation Water Management – Exempt with Farm Bureau participation. Only incidental amounts of land use devoted to silviculture in watershed.

Urban (5.3.1) New Development – Exempt with NPDES Phase II participation.

Urban (5.5.1) Existing Development - Exempt with NPDES Phase II participation.

Urban (6.6.2) Operating On-site Disposal Systems – Exempt <1 HSTS per 20 acres

Urban (5.8.5) Road, Highway, and Bridge Operation and Maintenance - Exempt with NPDES Phase II participation.

Urban (5.8.6) Road, Highway, and Bridge Runoff Systems - Exempt with NPDES Phase II participation.

Problem Statement

The problems, or issues, affecting the Mentor Marsh Watershed are best described in the Issues Characterization document that was created for the MARC by Davey Resources in 2001:

“Over the past several months, Task Forces have worked to describe the problems in the Marsh Area SAMP region. The ODNR Division of Real Estate and Land Management, and Dee Hammel with the Ohio Department of Natural Resources’ Division of Natural Areas and Preserves facilitated a process through which the MARC identified and ranked a list of 27 strategic issues to be addressed in the SAMP. These issues were then divided among task forces, which were formed to describe and characterize the issues. These issue characterizations provide the information necessary to begin the strategy development process. Five main issues are characterized by their respective task forces in this document:

- Water Quality
- Land Use and Economic Development
- Wetlands and Biodiversity

- Recreation and Public Access
- Shoreline Management and Nearshore Issues

These five issues were identified as the most critical issues of concern in the region. It is important to stress that this document is dynamic and subject to comments and changes.

Before implementation plans could be addressed, specific items were identified in each of the five main issues. The MARC identified sub-issues within each main issue and assigned a priority status of high, medium, or low. The high and medium priorities were decided to be time sensitive and/or were not currently being addressed by an existing program. Low priority issues were typically covered by existing programs or were otherwise chosen as lower priorities by the stakeholders.

The following is a thorough description of each issue from the “Issue Characterizations Marsh Area SAMP”. (Davey Resources, 2001)

Water Quality

Water quality is a concern throughout the Marsh Area SAMP region. A thorough review of the causes of degraded water quality includes both point and nonpoint pollution sources. Water quality issues are inherently challenging due to the cumulative nature of water quality impacts from watershed activities and the often latent nature of the problems. Planning focus must be toward the impacts of erosion and sedimentation and the loss of habitat upon water quality in order to implement strategies through which long-term protection of the resources can be ensured.

Point Source Pollution

Waste Water Treatment Systems – Low Priority / Urban (5.6.1) and (5.6.2)

These types of sources are controlled primarily through state-run regulatory programs administered by the EPA under the Clean Water Act. Although point sources are regulated, point source pollution from industrial stormwater discharge, industrial sanitary discharge, wastewater treatment plant discharge, and sanitary sewer inflow infiltration may be adversely affecting water quality in the Marsh Area SAMP region.

The wastewater treatment plant located in the watershed is the Greater Mentor Wastewater Treatment Plant. This facility treats 20 million-gallons per day of activated sludge and discharges into Lake Erie immediately east of the mouth of Mentor Harbor. Recently upgraded in July of 2000, the plant has been operating in 100% compliance with their National Pollution Elimination Discharge System (NPDES) permit.

Prior to the plant upgrade and the elimination of Uniroyal Chemical Company, an inhibiting industrial wastewater source, the facility experienced difficulty in achieving consistent discharge compliance. Uniroyal and the Lake County Department of Utilities engaged in a public dispute over the inhibition of the facility’s operation during the 1990’s. The controversy ended in August 1999 when Uniroyal closed its doors and

moved its operations to Mexico. Within two weeks of the industry's closure, the plant recovered and began meeting discharge standards.

Oil and Brine Storage Lagoons and Wells – Low Priority / Urban (5.3.2)

Some concentration of salts and minerals is necessary for the survival, growth, and reproduction of all living organisms. Northeast Ohio and all of the coastal areas along Lake Erie are freshwater ecosystems with typically minimal concentrations of salts and dissolved minerals. Plants and animals throughout Ohio have adapted to life in these freshwater, low mineral environments. Under these conditions, organisms have developed methods to acquire and utilize salts and minerals. Plants use the concentration of salts and dissolved minerals within their tissues to assist in the uptake of water.

Accidental spills from oil and brine wells can introduce large concentrations of salts and minerals into the environment, which in turn can eliminate most, or all, of the native vegetation within a given area. Such sudden and dramatic increases in the concentrations of salts and dissolved minerals can have damaging and dramatic effects. Most of our native flora and fauna cannot tolerate high levels of salts in their environments. A few species of plants are able to adapt to high levels of salts and dissolved minerals. Common reed (*Phragmites australis*) is well adapted to saline environments. This provides an opportunity for monocultures of salt-tolerant species like common reed. Once established, this species can prevent the return of a healthy and diverse ecosystem.

Wetlands are particularly sensitive to the introduction of salts and minerals. Because most wetland environments are depositional, water does not flush through these systems and salts tend to remain for decades. This further hinders the return of a diverse native ecosystem of plants and animals. This contributes to the present poor water quality at Mentor Marsh.

Brine, a salty byproduct of drilling gas and oil wells, is generally disposed of through injection into wells and pockets about a half-mile underground, below drinking water level. Before the brine is injected it is often stored in a holding pond or lagoon. Improperly designed or illegally constructed oil and brine storage lagoons threaten to degrade water quality at ecologically sensitive areas in the watershed. These lagoons can often be attractive nuisances to waterfowl and other wildlife when not properly managed.

Most, but not all, of the wells have been abandoned and sealed. Historically, high concentrations of dissolved solids and chlorides have entered Mentor Marsh via Black Brook, mainly from Diamond Shamrock's salt brine wells and a waste salt disposal site owned by Jerome Osborne. In 1991, an abandoned brine pit covered with thick oil resulted in the deaths of 59 Canada geese and a Mallard duck. By 1996, the number had increased to over 100 deaths of birds and waterfowl, including a Blue Heron. The deaths were directly attributed to the oil and brine in the storage lagoon. This lagoon also had an oil spill in 1995 that migrated to a nearby creek. On June 18 and 26, 1996, spills totaling

approximately 50,000 gallons of oil and brine were reported. The spills made their way to a tributary of the Mentor Marsh. The lagoon was observed to have 1,000,000 gallons of an oily water mixture in the 12,000,000-gallon impoundment.

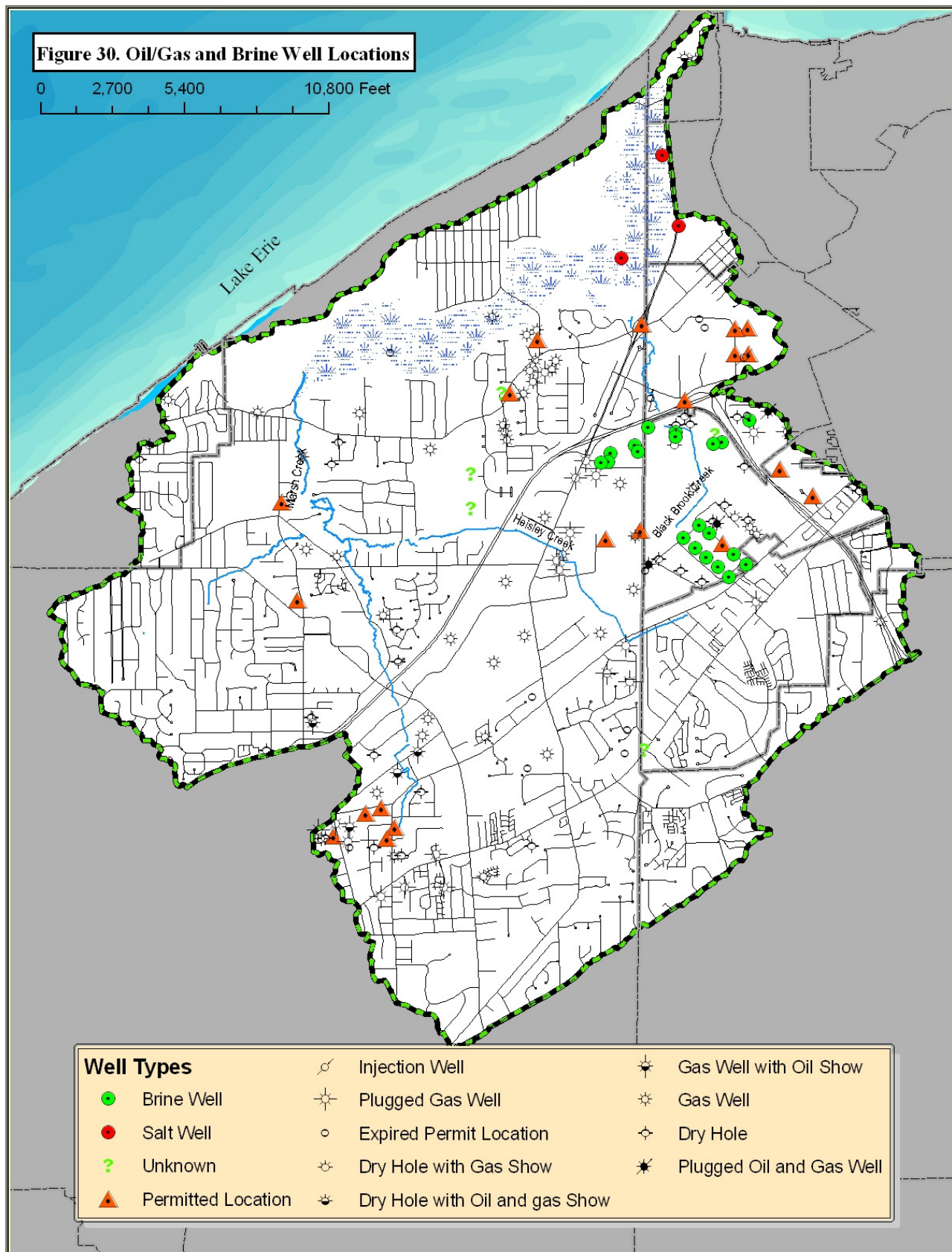
At the site of the impoundment are also above ground storage tanks. The lagoon and above-ground tanks were reported by the U.S. EPA to present a substantial threat of discharge of oil into or upon the navigable water of the United States. U.S.EPA, U.S. Coast Guard, Ohio EPA, Lake County Health District, Painesville Township Fire Dept., Ohio Department of Natural Resources and others have been involved in the remediation activities and closure activities at this site. When the clean up was complete, 70,000 gallons of crude oil from leaky tanks, 2,000,000 gallons of contaminated water and 30,000 gallons of sludge from the lagoon were removed at a cost of \$1.5 million to the U.S.EPA.

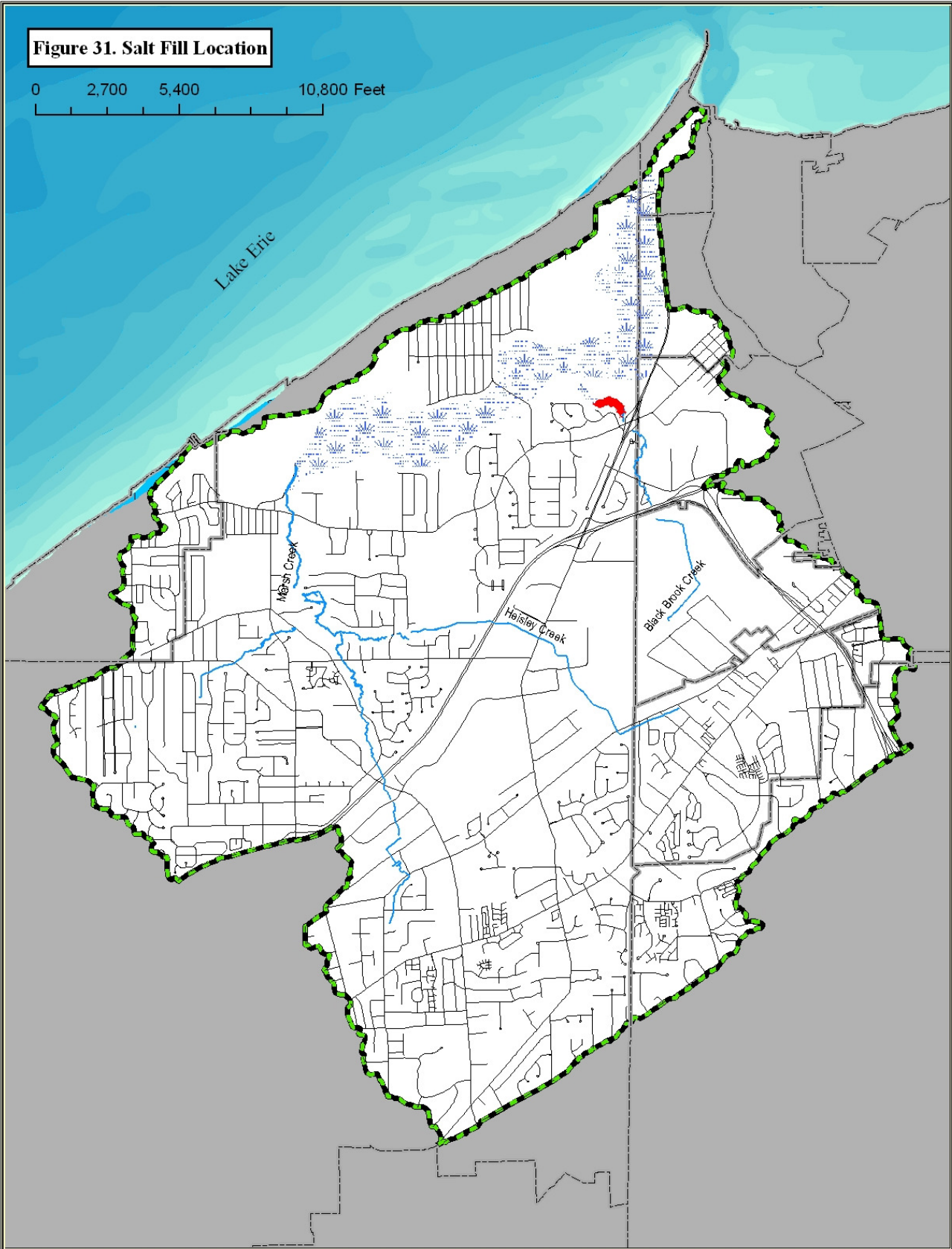
A related concern is the potential of an underground release once the brine is injected to the wells. The leak could migrate through cracks and fissures deep in the earth looking for an outlet. Due to its proximity to numerous underground gas and oil wells now containing brine, the Mentor Marsh would receive any releases from these facilities.

Figure 30 shows the location of the oil and gas wells in the watershed. Figure 31 shows the location of the salt landfill along the mouth of Blackbrook Creek

Figure 30. Oil/Gas and Brine Well Locations

0 2,700 5,400 10,800 Feet





Salt Contamination – High Priority / Urban (5.3.2)

Between 1954 and 1966, the once freshwater Mentor Marsh was severely impaired by runoff from salt wells and salt mine tailings. Between 1954 and 1959, salt brine from salt wells on Blackbrook Creek flowed into the marsh and caused die-back of swamp forest between the mouth of Blackbrook and Corduroy Road. In 1966, thousands of tons of low- grade salt ore were dumped over a five-acre area near Routes 44 and 283. In the 20 years after the first salt entered the marsh, sodium ions spread throughout the marsh, significantly changing the ecology of the preserve. The system changed from a freshwater swamp forest to a marsh dominated by salt-tolerant species such as the common reed, *Phragmites australis*.

Mitigation efforts were undertaken in the early 1980s, but it wasn't until nearly 20 years later that we would understand the effectiveness of those efforts. In 1999, an Akron University graduate thesis was completed that assessed the present water conditions of the marsh. The study indicated that chloride levels from salt contaminated runoff from the Osborne Salt Fill have decreased significantly.

The general decrease in chloride concentrations from the baseline study in 1988 to those found by Whipple's study shows that the remediation efforts were somewhat successful. Even with significant improvement in surface water conditions, however, the marsh remains drastically altered from its natural state.

A salt pollution study of Mentor Marsh has been conducted by the Ohio State University with financial support from the Lake Erie Protection Fund (LEPF) and the Ohio Coastal Management Program (OCMP) from September 2004 to 2006. The results discussed below are based on the analysis of preliminary data, which are unpublished. The data show a continued pattern of salt pollution of Mentor Marsh. Total chloride results have been consistently above the tolerance limit for a freshwater swamp forest but well below the tolerance limit for the invasive species *Phragmites australis* (Cav.) Steudel.

The spatial patterning of total chloride levels indicate two primary sources of salt pollution to Mentor Marsh: the salt fill placed over Blackbrook immediately upstream from the Mentor Marsh/Blackbrook confluence; and the abandoned brine fields located to the south of State Route 2 within the Mentor Marsh watershed.

The results indicate the salt fill continues to release large amounts of salt pollution to the Marsh basin. Water samples collected immediately downstream from the salt fill consistently show total chloride levels greater than the upper limit for freshwater ecosystems of 500 mg/l. In April 2005, a water sample collected from this location had total chloride of 2,000 mg/l. The EPA limit is 300 mg/l. Of the 36 water samples collected from this location during the 18-month study period, 29 have exceeded the EPA limit. The average total chloride for this location for the study to date is 721 mg/l.

The salt pollution downstream from the abandoned brine fields might be owing to the recent disturbance of salt-laden soils in this area. In September 2004, a water sample collected downstream from the abandoned brine fields had total chloride of 1,600 mg/l. Of the 47 water samples collected at this location during the 18-month study period, 37 have exceeded the EPA limit of 300 mg/l. The average total chloride for this location for the study to date is 591 mg/l.

Results from additional sampling points located within the marsh basin and at both of its outlets indicate that the salt pollution gets distributed throughout

Mentor Marsh. Results show all sample locations within the Marsh basin have exceeded 300 mg/l on multiple occasions except for the remnant swamp forest area located in the southwest portion of the preserve. This area has never exceeded 300 mg/l and has an average total chloride for the study period of 172 mg/l, which is the lowest for any location sampled. This area's location away from the main flow of contaminated water provides a refuge for the remaining swamp forest species (Fineran, Unpublished Data).

Additional investigations were performed by the Ohio EPA in June, 2007 on seeps and surface water on the cap of the landfill. The analytical results of these investigations resulted in the issuance of a "Notice of Violation" to the landowners on November 17, 2006. "Salt contaminated groundwater and surface erosion are allowing the release of pollutants into adjacent surface waters at values far in excess of the State Water Quality Criteria for Total Dissolved Solids and pH as established in Rule 3756-1-07 of the Ohio Administrative Code. The releases have caused a documented violation of the Water Quality Criteria in Black Brook, and then impact the Mentor Marsh, a State Nature preserve." (EPA, 2007)

Hazardous Waste Contamination – Low Priority / Urban (5.3.2)

The Diamond Shamrock site began operations in 1912. Over its 65-year history in Painesville Township, the company produced soda ash, caustic soda, coke sodium bicarbonate, cement, chlorine, chlorinated hydrocarbons, sodium dichromate, chromic acid, chlorowax, and other products. A large amount of hazardous and solid wastes were disposed in large "soup ponds" on site. The wastes include acid, calcium chloride, limestone impurities, chrome wastes, solvents, asbestos, and other wastes.

The plant closed in 1977, and one of the waste lakes was capped in 1982. Ohio EPA and US EPA investigations led to placement on the National Priorities List (Superfund). The Superfund designation has since been withdrawn in favor of a cooperative working relationship among local, state, and federal authorities and the potentially responsible parties. Remediation activities are ongoing at the site.

The Uniroyal facility, which is currently closed, manufactured Paraquil, an intermediate chemical for the tire industry. A radioactive waste site is on the company property, with the potential to leak into the Grand River upstream of the drainage ditch connecting Mentor Marsh and the Grand River.

Uniroyal Chemical began operations at the present 130-acre site in 1965. The site produced various types of nitrile rubber products and ceased operations in June 1999. The company signed an administrative order with the Ohio EPA in May 1999 that requires the company to investigate and clean up any chemical contamination. Further information can be found on the internet at www.lrb.usace.army.mil/fusrap/paine.

Finally, several companies continue active chemical production operations on Fairport-Nursery Road. While these facilities are not located within the watershed, leakage at any of these sites threatens the health of the watershed. Further investigation of these operations is required to better assess the potential threat to the marsh area.

Storm Water Management – Low Priority / Urban (5.3.2), (5.3.3), (5.8.1), (5.8.2), (7.4.1), 7.4.2), 7.5.3) and 7.6.1)

Under intensive pressure from development, the marsh area has been losing beneficial wetlands and riparian areas at a rapid pace. Residential and commercial development removes considerable areas of vegetation from the landscape and increase paved, or impervious areas. Impervious surfaces impede absorption of rainfall through the soils, which acts to recharge the groundwater. Interrupting this natural recharge process, impervious surface area reduces aquifer capacity and limits the natural flow to rivers and streams during dry periods.

Increasing impervious areas impacts the potential quantity and quality of stormwater runoff. Pollutants and toxic substances such as oils and road salts are carried from these impervious surfaces by stormwater and are deposited in surface water bodies and groundwater. These stormwater discharges into coastal waters and tributary streams increase as impervious areas increase throughout the watershed. The Land Use/ Economic Development Issue Characterization addresses the effects of imperviousness in further detail.

Erosion and Sediment Control – Low Priority / Urban (5.3.2), (5.3.3), (5.8.1), and (5.8.2)

Traditionally regarded as an agricultural issue, erosion and sedimentation have been drawing a great deal more attention in urban areas. It has become evident that the agricultural-related issues have been masking growing erosion and sedimentation problems surrounding urban land uses and construction site runoff. The problems of erosion and sedimentation (“E&S”) are caused by alterations to vegetation and soil surfaces within the watershed. Vegetated areas adjacent to water resources, called riparian buffers, are important landscape features that help to maintain and/or improve water quality by preventing erosion and controlling the transport of sediment into adjacent wetlands and water bodies. Buffer zones are particularly valuable for removing pollutants and excess nutrients from surface water runoff and in some cases from the underlying groundwater. Wetlands also provide the same benefits as riparian buffers, as they serve as collectors and natural recyclers for the eroded sediment. Sediments are particles suspended in a body of water that eventually settle out and accumulate on the bottom of the body of water. Sediment pollution causes problems in water quality by reducing light penetration, covering aquatic organisms, bringing insoluble toxic pollutants into the water, and filling waterways. Suspended sediments adversely affect water quality by carrying toxic chemicals, both organic and inorganic, into the water. The sediment particles provide surface area to which some insoluble, toxic compounds adhere. Additionally, pathogens, or disease-causing agents, can be carried in stormwater runoff and may be partially responsible for some of the bacteria contamination in nearshore areas. Further investigation is needed to better understand the degree to which bacteria along beaches and other toxic elements carried by runoff present public health and safety concerns.

Due to the potential for impacts such as property damage and public safety concerns, regulatory agencies and communities are taking urban E&S seriously. In an effort to abate the runoff pollution, the Lake County Board of Commissioners adopted the Lake County Erosion and Sedimentation Control Rules that require reasonable standards of management and conservation

practices. This legislation affects the Mentor Marsh only in the township areas. The City of Mentor, which constitutes 70% of the SAMP region, has its own less stringent E&S rules, (City of Mentor Subdivision Regulations, Section 152.057).

Home Sewage Treatment Systems (HSTS) – Low Priority / Urban (5.6.2)

The density of HSTS in the watershed is <1 per 20 acres and is therefore exempt. Household sewage disposal systems are usually present in the unsewered areas of a community. A variety of factors can affect how a home sewage disposal system will function. Those factors include, but are not limited to, soil types, water tables, depth to bedrock, slope and the amount of water used in the home.

Previous and current studies are indicating that systems throughout Ohio have a statistically significant failure rate. In 1997, the Lake County General Health District initiated a two-phase study to determine the effectiveness of the sewage systems being utilized in at-risk soil types. Systems installed from 1988 through 1996 had an overall failure rate of 17%. The failure rate of home septic systems surveyed in 1997 was 35%. Systems installed where homes are 30 to 40 years old have an estimated failure rate of over 50%.

Used to determine the failure rate of home septic systems, this study was primarily for statistical purposes and not for an enforcement program. Traditionally, the Health District issues orders to repair malfunctioning systems based on a complaint basis. There are no routine inspection programs once a system has been approved and installed.

When a household sewage disposal system fails, one of the results can be off-site discharge, which is a nonpoint source of water pollution. This type of nonpoint pollution may affect the water quality in a couple of different ways. One of these ways is by fecal contamination. Fecal matter contains coliforms, a group of bacteria produced and hosted by feces, soil, water, vegetation and other matter. If present in water, a dangerous water quality problem arises.

Another effect of off-site septic discharge is lack of clarity due to suspended solids when the suspended solids begin to settle in the water. After settling, a sludge layer can form and cause oxygen demand problems. Septic waste in the watershed can create high biological oxygen demand, which robs the water of dissolved oxygen. When dissolved oxygen levels are low, anaerobic (without oxygen) microorganisms produce compounds that have very unpleasant odors, further deteriorating water quality.

The Lake County Health District is currently pursuing new alternatives to traditional household sewage disposal methods. The alternatives include drip irrigation technology and variations of mound systems.

Impoundments and Dams / Hydromodification (7.4.1)

This section was not specifically identified during the development of the SAMP. However, it is a required Management Measure of the Ohio Coastal Nonpoint Pollution Control Program. No impoundments or dams, with the express purpose of creating a reservoir have been located within the watershed. Several man-made features as well as beaver dams in the marsh have acted as hydrologic

controls in the watershed. These features are well documented in the Fineran dissertation “Assessing Spatial and Temporal Vegetative Dynamics at Mentor Marsh, 1796 to 2000 A.D.”:

Beaver dams

Beaver dams are cited as a reoccurring problem in the Shipman Pond area. The dams obstruct flow at the mouth of Shipman Pond and raise water levels in the eastern basin. Damming of the mouth of Shipman Pond increases retention time (flood duration) within the marsh basin thereby increasing flood stress. The newspaper article (Headlands Beach Archives: Unknown, August 1, 1974) also mentions the damage done to the trees within the marsh because of the increased flood stress. Currently, beaver continue to build dams across the mouth of Shipman Pond elevating water levels in the eastern basin. State Park rangers periodically clear the dams but beavers quickly rebuild them sometimes in a single night. Water levels in the marsh have been observed to fall nearly 3 feet immediately following the removal of the beaver dams.

Greater Mentor Wastewater Treatment Plant

In 1964, the Greater Mentor Wastewater Treatment Plant (WWTP) was built on the southwest bank of Mentor Marsh. Concurrent with its construction, an embankment was built within the marsh basin to support a large 42-inch corrugated metal outfall pipe with a 36-inch polyethylene liner, which carries treated effluent to Lake Erie. The embankment begins on the southwest bank of the marsh and ends just south of the drainage ditch which flows from east to west within the marsh basin. The embankment carries the WWTP's discharge (effluent) pipe above ground to the embankment's end and then the pipe runs underground to its outfall, which is below water level within Lake Erie and is located to the northeast of the mouth of Mentor Harbor. Therefore, the WWTP does not discharge its treated effluent into the marsh basin. The embankment and discharge pipe are still used today and many trees have grown along the embankment. Although the embankment obstructs flow in this portion of the marsh, several breaches in the embankment allow flow to cross at points along its length. Sometime between the treatment facility's construction in 1964 and 1973, a sanitary sewer line was installed which carries the raw sewage from Mentor Headlands to the wastewater treatment plant. The sewer pipe crosses the marsh from a point on the north bank of the marsh, just west of Wake Robin Trail, to the south bank of the marsh, east of Becker Pond. The sewer pipe is half buried in the marsh with approximately one quarter to one half of the top of the pipe sticking up above the marsh surface. The sewer pipe is made of corrugated metal and is 36 inches in diameter. It appears to be a minor obstruction to surface flow within the marsh basin.

Roads and trails

Corduoy Road was originally built in 1854. As discussed in Chapter 2, a bridge appears to have been built over a stream flowing within the marsh at the time of Corduoy Road's construction. This bridge may have been in existence as late as 1925. There is mention of Corduoy Road being paved in 1927. Perhaps at this time the bridge was replaced with the three culverts that channel flow beneath the roadway today. Corduoy Road acts as a hydrologic obstruction to flow across the marsh basin. The magnitude of its affect on flood duration to the east of the roadway is uncertain. Wake Robin Trail is a boardwalk that extends across the

west central basin from the north side of the marsh terminating before it joins with the south bank near the Blackbrook Golf Course. The boardwalk also acts as a hydrologic obstruction to flow within the marsh basin. Several channels have formed beneath the boardwalk with high velocity of flow observed during times of high water. Again, the magnitude of its effect on the flood duration east of the boardwalk is also uncertain.

Land Use and Economic Development

The Marsh Area SAMP region is largely developed, dominated by residential land use. Current land use practices threaten the long-term viability of exceptional natural resources within the region. Existing development patterns compromise ecosystems, and projected future growth and development threaten to further fragment and divide remaining resources. A diversity of landowners and a complicated mix of stakeholder interests and attitudes contribute to land use problems.

The Land Use/ Economic Development Task Force is working to address these and related issues in order to facilitate the development of local land use plans and development controls as a means of safeguarding coastal natural resources and resource usage while preserving and promoting economic development in the SAMP region.

Projected Growth – Low Priority / Urban (5.3.3)

Areas under considerable future development pressure include sensitive areas that are critical to the health of the region's natural resources. Currently, undeveloped, sensitive property near the marsh is not anticipated to be developed in the near future. However, undeveloped areas near the Blackbrook and Marsh creeks may be developed in the next 5-10 years.

The Marsh Creek watershed currently has the most residential, commercial, and industrial development. The major areas of development in the City of Mentor, within the watershed, are the Diamond Center at SR2 and Heisley Road, the Tyler Blvd. extension from Hopkins Road to Heisley Road, and various areas along Mentor Ave. (U.S.20.) The Diamond Center and Mentor Avenue areas are predominantly commercial and office and will continue to develop in this manner for the next five to fifteen years. The Tyler Blvd. area and the Heisley Road area will continue to develop with industrial and office, with limited commercial use interspersed throughout the area on a conditional use permit basis. These commercial uses are complementary to or accessory to the industrial use permitted. This development is likely to occur over the next ten to fifteen years. The vacant parcels along Mentor Avenue will also continue to develop over the next five to ten years.

Concord and Painesville Townships, in the Marsh Creek watershed, have been almost completely developed. The existing uses and zoning are residential and commercial, which are approaching built-out capacity. Residential development has slowed to about one to two houses every three to four years. Commercial development is more active but will be built out within five to ten years. Redevelopment activity is already occurring in the area.

The Blackbrook Creek watershed is the smaller of the two watersheds in the SAMP region that drains into the marsh. Most of the development in this watershed will occur

within Painesville City and Painesville Township. Painesville City recently annexed 480-acres from Painesville Township. Single-family housing has been proposed for the area south of CSX Railroad and industrial development to the north. Development of this area is dependent on obtaining access and will likely occur over a twenty- year period or more.

Several factors affect this development trend. These factors are access, wetlands, possible existence of hazardous waste on site, soil conditions, brine wells, and drainage. The balance of the watershed, zoned for light industrial with some areas of residential and two small areas of commercial, will develop slowly for the next five years and depend on Mentor reaching its saturation point. Industrial uses are anticipated to grow more quickly than residential and commercial land uses. Development of this area will probably take 10 to 25 years.

Uncoordinated Land Use Planning – High Priority / Urban (5.3.3)

Continued consumption of the SAMP region's open space and natural resources for the purpose of residential development is the net result of the cumulative consequences of independent local land use decisions throughout the region.

Though the intent of land use planning is to empower local governments to meet the needs of their communities, the result has been fragmentation among the local jurisdictions and little coordination given to regional needs or consequences. Communities do not have a unified vision regarding the desired state for ownership, natural resource management, quality, or levels of use for the marsh and coastal areas.

A total of eight jurisdictions are included in the SAMP area: Mentor, Mentor-on-the-Lake, Painesville, Painesville Township, Concord Township, Grand River Village, Fairport Harbor, and Lake County.

Past difficulties in devising resource management policies for the Mentor Marsh and shoreline as areas of particular concern have resulted, in part, from the breadth of perspectives represented by the diversity of landowners.

Given the diversity of owner interests and available planning tools, local policies must be devised to take into account unique ownership perspectives and natural resource management issues of the individuals and the whole management area. "Common Groundwork: A Practical Guide to Protecting Rural and Urban Land" (Institute for Environmental Education, 1993) is a handbook for making land-use decisions that will provide a wealth of options for the MARC during the Strategy Development Phase of the planning process. This handbook contains a host of privately and publicly initiated tools, such as zoning ordinances, subdivision regulations, and land trusts to consider for use in the SAMP.

Development Pressures – Low Priority / Urban (5.3.3)

Development, particularly residential, is booming in the Marsh Area SAMP region. The development rate for the SAMP region is approximately 205 to 225-acres per year, with an average of 42 lots per subdivision. Generally, this rapid residential growth stimulates positive economic change for the region's communities in the short term. This growth can improve the quality of life for community residents in the short run through an

increased tax base and the provision of services that follow; however, in the long term it expands the demand for services beyond the increase in tax base.

In addition to the economic burden of providing services to support residential growth, one of the many negative environmental impacts is wildlife habitat loss due to construction and development. Loss of habitat can destroy the ecotourism component in the marsh area. The economic benefits of visitors to the SAMP region's beaches, natural areas and preserves are highly significant to the region's economy.

Another negative impact development can have on a community's economy is the property damage created by flooding and erosion. When development occurs, the amount of impervious surfaces increases. Impervious surfaces are paved surfaces, such as roads, driveways, and parking lots. These impervious surfaces prevent rainwater from percolating into the ground, thus decreasing the area's natural flood and erosion control capacities. Development occurring on floodplains and stream bank slopes disturbs anchoring vegetation and, consequently, causes the sediment to erode. Floodplains, wetlands, and riparian areas, or lands adjacent to streams or rivers, absorb rainfall and snowmelt. Building on or near these critical areas prevents their ability to minimize the force of runoff, thereby increasing the erosion of stream banks and slopes.

Another related consequence to increasing impervious surfaces is flooding. The increased flow rate and quantity of rainwater or stormwater due to the lack of vegetation on eroded stream banks can present expensive and dangerous flooding problems to landowners along the water. Homes and roads, bridges, and other infrastructure are threatened from increased flooding and erosion.

Wetlands and Biodiversity

Wetlands are of particular importance in the Marsh Area SAMP region. In addition to the biological and environmental quality values wetlands provide, there are numerous associated socio-economic values, such as flood control functions, erosion protection, pollutant filtration, and aesthetics. Wetlands promote biodiversity, defined as an ecosystem's inclusion of a variety and quantity of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur.

The Mentor Marsh State Nature Preserve, City-owned Mentor Lagoons Nature Preserve and Marina, Headlands Dunes State Nature Preserve, and Headlands Dunes State Park have been designated for varying degrees of use while abiding by the principles of natural area preservation. In spite of local, state, and national esteem, these biological gems are threatened. Residential, commercial, and industrial development encroaching on the edge of environmentally sensitive sites continually threatens environmental quality and the long-term viability of the ecosystems. This development, its accompanying hydromodification, and the salt contamination from past years have changed natural landscapes, altered drainage patterns, fragmented inland wetland habitat, stressed littoral ecosystems, and reduced biodiversity throughout associated unique biotic communities.

It is vital that the public understand the current and potential residential and industrial impacts to the environmental quality of natural regional assets, as well as the role of the Marsh Area SAMP's environmental planning initiatives for protecting the rich natural resources of the region.

Biodiversity Loss – High Priority / Urban (5.3.3)

Almost immediately following the brine leakage from salt wells into Black Brook Creek, which flows into Mentor Marsh, the maple-ash-elm swamp forest began to die. Whipple's thesis determined the long-term historical impact of the salt contamination on marsh vegetation by comparing aerial photographs taken over the years between 1937 and 1991. The maps reveal how the salt contamination changed a rich swamp forest community to one dominated by common reed, which occupied 75% of the marsh by 1991. With the die-off of the swamp forest and loss of other native plant communities, a niche was created for common reed and cattail to flourish.

In an ongoing monitoring program, the Cleveland Museum of Natural History has found a remnant of the original swamp forest that is regenerating and shading out some of the common reed. Some examples of efforts to preserve biodiversity include Headlands Dunes State Nature Preserve and vernal pool creation adjacent to Mentor Marsh.

Home to the sea rocket, beach pea, seaside spurge beach grass, and purple sand grass, the 24-acre Headlands Dunes State Nature Preserve is legally preserved as a lakeshore beach dune community through its designation as a Coastal Barrier Resource Area. The preserve is proposed for critical habitat designation for the endangered piping plover, a shore-nesting bird native to the Great Lakes. Piping plovers use wide, flat, open, sandy beaches with very little grass or other vegetation. Nesting territories often include small creeks or wetlands. Many of the coastal beaches traditionally used by piping plovers for nesting have been lost to commercial, residential, and recreational developments.

The Cleveland Museum of Natural History with the approval of the U.S. Army Corps of Engineers, ODNR, Division of Natural Areas and Preserves and the Mentor Marsh Board of Management has recently created 2-acres of vernal pool wetlands in forested uplands to provide habitat for salamanders, frogs, turtles and wood ducks. This vernal pool and hummock habitat was originally lost when the area was settled and the land cleared and leveled for agriculture. Vernal pools are smaller, typically isolated wetlands ecosystems that periodically dry out during late summer. The regular drying of these wetlands prevents the permanent establishment of fish. Vernal pools are often home to sensitive species of invertebrates (i.e. fairy shrimp) or amphibians (i.e. mole salamanders) that cannot tolerate fish predation. Biodiversity is further threatened due to increased development pressures in the watershed. Despite the measurable environmental, social, and economic benefits of wetlands, more than 50% of the wetlands in the continental United States and over 90% of Ohio's wetlands have been destroyed as a result of conversion to agriculture, mining, forestry, and urban uses during the past 200 years. Development threatens the entire marsh area, including Mentor Marsh State Nature Preserve, Headlands Dunes State Nature Preserve, Mentor Lagoons Nature Preserve and Marina, and Headlands Dunes State Park.

Areas targeted for development are often sites overlooking, abutting, or in close proximity to these areas. Mentor, Mentor-on-the-Lake, the villages of Fairport Harbor and Grand River, and Painesville Township are located on the shores of Lake Erie in the center of Lake County, Ohio. The region is generally urban with homes, industry, and commercial development immediately adjacent to significant wetlands in the SAMP area.

Development pressures in these areas are intense. Between 1995 and 1999, over 1,700 family units have been built within the nearby communities of Mentor, Painesville, Painesville Township and Mentor-on-the-Lake. In the recent past, new homes were constructed directly abutting the Mentor Marsh without any buffer requirements. Development occurring too close to the wetlands has the potential to directly reduce the

amount and quality of wetlands required by flora and fauna that depend on this habitat. For instance, homeowners deposit grass clippings and other yard wastes into the preserve, and urban runoff from chemicals applied to new lawns may go directly into the preserve.

Additionally, large developments within the City of Painesville in the Blackbrook Watershed will impair the marsh area with increased stormwater runoff from new roads and other impervious surfaces. Increased pollutant loads from new development are likely, if proper controls are not applied.

Hydromodification – High Priority / Hydromodification (7.4.1), (7.4.2), (7.5.3), and (7.6.1)

Hydromodification has yet to be well studied in the watershed, and consequently, the effects of changes to the hydrology over time are not totally understood. Currently students of The Ohio State University are conducting hydrology research in the marsh. This information should help land managers and planners make more informed decisions on future marsh area development. However, continued long-term hydromodification, in conjunction with rapid growth and development, can lead to the isolation of critical habitats and species from larger ecosystem functions. Ultimately, these activities further contribute to continued losses in marsh area biodiversity.

Compounding these impacts, mitigation for these losses has historically been implemented outside the marsh watershed, further impairing the ecological function of the remaining freshwater wetlands. Specifically, alteration of wetland hydrology or sediment budgets, increased surface runoff through ditching, and wetland conversion to developable lots are some of the examples where small alterations in the natural landscape can result in a cumulative impairment of the wetland's ecological functions.

In addition to direct losses in habitat caused by residential and industrial development, hydromodification resulting from development increases stormwater runoff. Stormwater controls increasingly replace natural riparian areas. As the amount of impervious surface increases with development, stormwater runs into adjacent water bodies, degrading adjacent wetlands and other natural habitats by increasing sediment, nutrient and contaminant loads. Hydromodification reduces the beneficial protection that wetlands provide (flood and erosion control and groundwater recharge). These problems are most apparent near areas of dense residential and industrial development. Federal Phase II Stormwater Management regulations must be considered in upcoming SAMP strategy development.

Natural Disturbances – High Priority / Urban (5.3.2)

Other disturbances include natural and man induced actions. The activities of beavers and other animals may naturally alter the marsh area and retard the restoration of the native swamp forest in the marsh area.

In 1973, beavers moved into the marsh, raising water levels and flooding the northeastern part of the preserve. Today, the presence of beavers, although ecologically important, continues to threaten the regrowth of a swamp forest and may require management.

Fire is both a natural and a human-caused disturbance. Natural fires may keep small areas open. On May 9, 1982, approximately 100-150-acres of marsh burned in the eastern part of the preserve. Another fire took approximately 350-acres on May 11, 1992 in what was

known as the “Mother’s Day Fire,” and approximately 60-90-acres of the preserve burned between August 1 and 13, 1998.

Public Understanding and Attitudes – High Priority / Urban (5.3.2)

The general public often does not recognize the value and functions of natural resources. The flood protection of wetlands is not appreciated until the wetlands are lost and residential flooding occurs in areas not previously flooded. Even then, residents often do not have a clear understanding of the connection of flooding to wetland losses.

The erosion protection afforded by natural beaches is not understood until the beach is lost to development and homes are threatened by Lake Erie storms. A lack of understanding of the natural systems that support our economy and quality of life can lead to inadvertent actions that reduce or eliminate the functions and values of the marsh area’s resources.

Creating public awareness of the value and functions provided by natural resources can help instill a sense of stewardship for the marsh area. Both landowners and key decision makers have a responsibility to protect, conserve and develop the marsh area in a sustainable manner. Individual actions can and do play a large role in the preservation and conservation of our natural ecosystems.

Outreach and education efforts are needed to increase awareness of and an appreciation for the natural resources of the marsh area. Such efforts can instill the environmental ethic that will lead to actions needed to restore biodiversity and reduce harmful impacts on the ecosystem.

Recreation and Public Access

For purposes of the Marsh Area SAMP, “recreation” refers to the breadth of experiences visitors enjoy at recreational facilities and via public access areas along the coast of Lake Erie, specifically within the Marsh Area SAMP region. Recreational opportunities and the assurance of public access to sites throughout the marsh area and along the Lake Erie coast provide for social, personal, economic, and environmental benefits. With rapid development of areas around recreational facilities within the SAMP region, many critical public access points could be in jeopardy.

A coordinated regional strategic recreational plan is needed to assess, connect and expand the current recreational and public access uses in the region. This brief discussion summarizes the current recreational conditions and public accessibility and serves as a basis for focusing planning efforts.

Lack of a Strategic Recreation Plan – High Priority / Urban (5.3.2)

Outdoor recreation is a significant economic activity in the Marsh Area SAMP region. A cooperative, coordinated approach to recreation resource management is needed to maintain the diversity and extent of exceptional active and passive recreational opportunities within the region. Currently, the area does not have a strategic plan to guide efforts to preserve and protect recreational and public access resources.

Although programs are effective within each entity’s recreation department, potential exists to expand sustainable, low-impact recreational uses within the project area. A